Bell Telephone MAGAZINE

SPRING 1957

Meteora, "Goddess of Weather," and her court, to be featured in

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VOLUME XXXVI NUMBER ONE SPRING 1957

Bell Telephone Magazine

A non-technical review, published quarterly to give Bell System management people a broader view of the history, objectives, operations, and achievements of this business than they might attain in the course of their day-to-day occupations, and an added sense of participation in the problems and accomplishments of our nation-wide public service.

Cover: "Meteora, Goddess of Weather," and her court, as featured in the Science Series program "The Unchained Goddess."

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A MEDIUM OF SUGGESTION and A RECORD OF PROGRESS

JUDSON S. BRADLEY, *Editor* SALVATORE J. TAIBBI, *Art Editor*

Published for the Bell System by the Public Relations Department, American Telephone and Telegraph Company, 195 Broadway, New York 7, N. Y.

FREDERICK R. KAPPEL, *President* S. WHITNEY LANDON, *Secretary* JOHN J. SCANLON, *Treasurer*

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Who's Who & What's What In This Issue

WHEN THE MANUSCRIPT of this issue's first article was received, its author was identified as "TV and Radio advertising supervisor." Ere it went to press, WILLIAM E. HAESCHE JR. was appointed "advertising manager – TV and Radio," and it was a pleasant task to change one line of type to conform.

When the telecast date for "Our Mr. Sun" was set, Mr. Haesche was given the assignment in A. T. & T.'s Public Relations Department to coördinate the task of promoting and publicizing the Science Series. Before that, he has been a group head in the radio-TV advertising section working on Telephone Time and The Telephone Hour. A newspaper man before he joined the Southern New England Telephone Company in 1945, he handled news assignments in that company's Public Relations Department until the Summer of 1952, when he joined A. T. & T. About a year later he became customer relations supervisor working with the information exchange program. He shifted to the advertising division in August of 1954. His article on the Science Series puts on record the interesting background of a new feature of our Public Relations activities. Just two years ago Mr. Haesche contributed " 'Telephone Time' Starts Its Sixteenth Year" to these pages.

William E. Haesche Jr.

Eustace L. Florance

SECRETARY AND TREASURER of the Chesapeake and Potomac Telephone Companies since July 1, 1956, EUSTACE L. FLORANCE joined the telephone industry in 1921 as an engineering assistant with the C. & P. Co. in Washington. After serving as division commercial supervisor and general commercial supervisor, Mr. Florance transferred to the C. & P. Co. of Maryland in 1929 as general commercial manager.

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George M. Dean

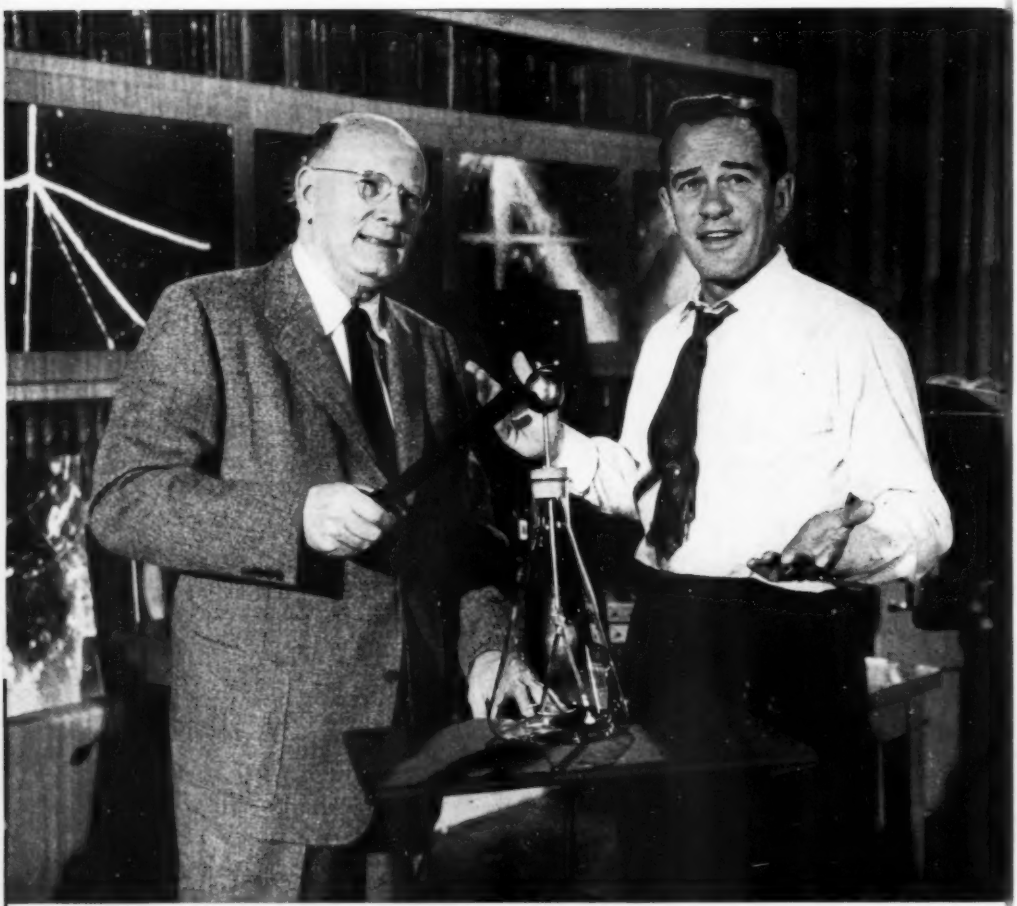
Seven years later he returned to Washington as general information manager at the headquarters of the four C. & P. Companies. In 1946 he went to the A. T. & T. Co. in New York on special assignment. He returned to the C. & P. as assistant general manager of the Washington company, and in 1952 was appointed assistant vice president. In this capacity he also served as chairman of the committee consisting of representatives of the A. T. & T. Co., the Long Lines Department, Bell Telephone Laboratories, Western Electric, and the C. & P. of Washington which created the telephone exhibit at the Smithsonian Institution described in these pages. Many telephone people contributed in various ways to the planning, designing, and successful achievement of this notable display — among whom may be singled out for special mention Norman Treadon, from Public Relations of the Ohio Bell Telephone Company, and Henry Kostkos, of the Publication Department of Bell Laboratories.

An old friend of this MAGAZINE, Mr. Florance contributed "How Washington's Telephones Went to War" to the issue for February 1943, and, with Austin Bailey of A. T. & T.'s Department of Operation and Engineering, "New Channels for Old" to that for August 1941.

AN ASSISTANT VICE PRESIDENT of A. T. & T.'s Department of Operation and Engineering since April of 1956, GEORGE M. DEAN had spent the preceding 32 years in the telephone business on the Pacific Coast—except for five years in the U. S. Army here and in Europe. Starting with The Pacific Telephone and Telegraph Company in San Francisco as an engineer in 1924, he became commercial engineer in Seattle in 1926. Eight years later he was appointed rate engineer in the company's Washington-Idaho Area, and assistant vice president there in 1947. He was made vice president and general manager of the

(Continued on page 69)

Heather Peto



Dr. Frank Baxter (left) and Richard Carlson are shown in their starring roles in "The Strange Case of the Cosmic Rays," the third of the Science Series programs.

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Interest and authenticity place Bell System show in first rank as entertainment, with palatable education for all ages as a significant supplementary value

OUR NEW SCIENCE TV SERIES PERFORMS A PUBLIC SERVICE

WILLIAM E. HAESCHE JR.

Advertising Manager—TV and Radio, PUBLIC RELATIONS DEPARTMENT, A. T. & T. CO.

"SCIENCE IS ONE of the great adventures of our time; I might well say *of all time.*"

So said Cleo F. Craig, Board Chairman of A. T. & T., as he introduced the first Bell System Science Series television program to a nation-wide audience on November 19, 1956. Judging by the success of the first two Science Series productions, "Our Mr. Sun" and "Hemo the Magnificent," millions of people agree.

Back in 1951, however, when planning started on the Science Series, there were few people in television advertising who would have agreed that a TV series based on science would be successful.

At that time there were few precedents for a major entertainment venture in popular science — in television or in the movies. Science needed popularizing, everyone agreed; but apparently no one was willing to tackle the problem of just how to do it.

Mr. Craig's conviction that science *is* one of the great adventures of all time, and the decision to produce the Science Series, may very well have contributed to the creation of a new dimension in television programming. Among the generally favorable newspaper and magazine reviews of "Our Mr. Sun" there were a number of reviewers who commented in this vein:

The New York *Times* said "The presentation was a long step forward in the enlightened use of television." The Cincinnati *Post* said "It proved again that television can be a tremendous educational force." The San Francisco *Examiner* called it "The most thrilling informative TV show of all time."

In deciding upon science as the basic format for the Series, Mr. Craig and Bartlett T. Miller, then A. T. & T. vice president of Public Relations, had reasons other than their belief that this kind of program would be welcomed by the public. One consideration was the growing shortage of young people choosing science for lifetime careers. This was bad for the country, and particularly bad for the telephone business, since the growth, extension, and improvement of telephone service is largely

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dependent upon the scientist and the engineer.

And, in broad intent, it was hoped that the Series would help to further public understanding of scientists and science. To a large extent, the key to better and more useful living for us all rests with scientists and the freedom and opportunity we give them to work in our behalf.

In a preliminary meeting on the Series which Mr. Craig held in October of 1951 with Mr. Miller and Mr. Harry A. Batten, chairman of the board of the N. W. Ayer advertising agency, a set of specifications was set up which, it was agreed, must be followed if the series was to achieve its objectives:

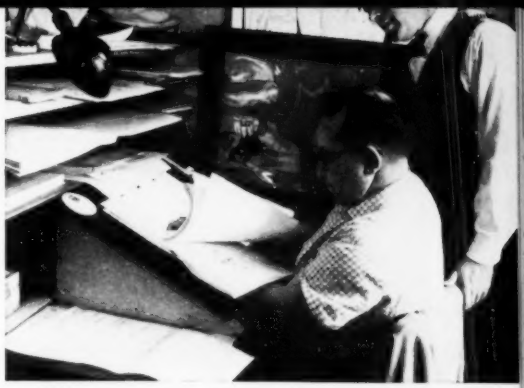
1. The programs must be of the highest quality.
2. They must be completely authentic, acceptable to scientists as well as to the general public.
3. They should interest the average viewer but should not talk down to the audience, or over-popularize the subject matter.
4. They must not risk offending the normal viewer.
5. And finally, they must embrace all fields of science, not just those which are closest to the telephone business.

It was further agreed that the use of the films should not be limited to television. To encourage greater interest in science,

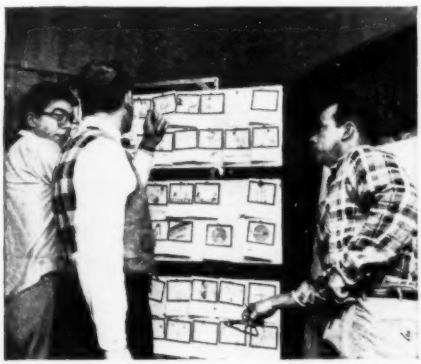
Production crew gets ready to blend live action and animation in a sequence in "Our Mr. Sun." *Dr. Frank Baxter and Eddie Albert (both at left of screen) are carrying on a conversation with Father Time and Mr. Sun.*

the programs should be made available to large numbers of scientists, science teachers, students, and other community groups. The consensus was that the use of the films in the schools was as important as their use as television programs.

During 1952 a great deal of preliminary work was done on the Series. More than 20 leading scientists in various fields were consulted. Among them were Carl Anderson, physical chemist and Nobel prize winner; Ira S. Bowen, Palomar Observatory



Ben Washam fans through a series of animation drawings for Director Bill Hertz.



At Shamus Culhane Studios, Assistant Director Joe Sistrom (left) goes over sketches preliminary to animating "The Unchained Goddess."

Artist Sam Weiss is making cloud formation backgrounds for scenes in "The Unchained Goddess."

astronomer; Ernest O. Lawrence, physicist and Nobel prize winner; Margaret Mead, noted anthropologist; Robert A. Millikan, physicist and Nobel prize winner; Glenn Seaborg, chemist and Nobel prize winner; Wendell Stanley, biochemist and Nobel prize winner; and Dr. Warren Weaver, of the Rockefeller Foundation.

Four leading science editors and writers were engaged as consultants. Based on these talks and on extensive editorial research, treatments were prepared for possible programs on a variety of scientific

Final step, before "shooting" animation, is transferring drawings from paper to plastic sheet.

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Producer-Director Frank Capra (center) discusses with Richard Carlson (right) and Dr. Frank Baxter a scene in "Cosmic Rays" at the Frank Capra studios in Hollywood where the first Science Series programs were made.

subjects. In all, there were 20 of these treatments for 60-minute programs and 50 treatments for 30-minute programs. A complete shooting script was prepared on the subject "Flight Into Space" to indicate the possible techniques of presentation.

All this was exploratory work, designed to find out how the subjects should be treated, whether they should be done "live" or on film, and to determine the most effective length for the program. Studies also were made of sources of material, methods of productions, and of possible suppliers, producers, writers, and directors.

The decision was made to go ahead with the production of one program. Out of 30 subjects already treated in one form or another, *The Sun* was selected as the subject for this program.

Many producers and directors in both New York and Hollywood were considered, in order to pick one who would be able to carry out the twin objectives of scientific accuracy and top quality entertainment. Frank Capra was interviewed early in 1952. Three times winner of an Academy Award for motion picture direction, Mr. Capra was a past master in the art of film production for the popular audience. In addition, during four years in the Army in World War II, he had devised a unique technique of imparting information through film. A trained chemical engineer, he was thoroughly familiar with science and the work of scientists. He saw a challenge in the Science Series and decided he wanted to do the job. On September 24, 1952, he signed a formal

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agreement to superintend the writing of a script about the sun and to assist in the production.

Five leading scientists in solar studies were retained to provide scientific information about the sun and to check the accuracy of the script: Dr. Farrington Daniels, University of Wisconsin; Dr. Armin Deutsch, Mount Wilson and Palomar Observatories; Dr. Donald H. Menzel, Harvard Observatory; Dr. Walter Orr Roberts, High Altitude Observatory, University of Colorado; and Dr. Otto Struve, University of California. Editorial research was done by Miss Jeanne Curtis. Mr. Donald Jones of N. W. Ayer coördinated all script work, arrangements with scientists, and plans for production.

The Scientific Advisory Board

IT WAS CLEAR that one of the most important steps in producing a science series of the type desired was to set up a Scientific Advisory Board, representing major fields of science and composed of leading scientists. To define the subjects to be treated, the board would secure outstanding experts in each field, and with these specialists, would prepare an outline of each subject to guide the producer. The board and its advisors would decide all questions of scientific accuracy and emphasis.

Dr. Ralph Bown, formerly vice president of the Bell Telephone Laboratories and now retired, and Dr. Warren Weaver of the Rockefeller Foundation, formed the nucleus of this Scientific Advisory Board. The two men worked closely on scientific aspects of the *Sun* film, reviewing scripts and helping to choose consultants. Since only one program was in preparation at the time, they decided not to assemble an entire board until a later date.

Before Frank Capra finished the preparation of the script on the *Sun*, he was engaged to produce the program as well. The animation scenes were designed and put into work by United Productions of America. Capra looked at literally miles of film footage about the sun and about scientists at work on sun research, and began to select clips for the final production. Donald Jones handled arrangements with scientists and took a camera crew to various scientific installations around the country to film new scenes. Eddie Albert and Dr. Frank Baxter were engaged for their roles before the camera, and a number of actors were engaged to provide the voices for the animated characters.

The program on the *Sun*, now called "Our Mr. Sun," began to take shape. And on May 5, 1954, after "Our Mr. Sun" had been previewed, plans were made to go ahead with the Science Series.

The series, it was determined, would paint a broad picture of science, rather than attempt to teach specific scientific subjects. It would take the position that science is a challenge that stimulates the imagination, not merely a collection of dry facts, and show scientific studies as part of the remarkable account of the wonders of nature. It would show both "pure" science (i.e., the acquisition of knowledge for its own sake) and "applied" science (i.e., the direct use of that knowledge to improve man's well-being). It would stress the work of scientists and show how they are constantly striving to find out more about the forces of nature. It would show what the results of this scientific research means to people in their everyday lives. It would show the drama and excitement of this never-ceasing inquiry and thus would help it to flourish and do even more for people everywhere.

DR. GEORGE BEADLE
biology and genetics

DR. JOHN BOWERS
medicine

DR. RALPH BOWN
engineering

DR. PAUL BURKHOLDER
bacteriology and botany

DR. FARRINGTON DANIELS
chemistry

DR. MAURICE EWING
geophysics and marine geology

DR. GEORGE HARRISON
physics

DR. CLYDE KLUCKHORN
anthropology

DR. WARREN WEAVER
mathematics

THE SCIENTIFIC ADVISORY BOARD

Once "Our Mr. Sun" had been produced, Dr. Bown and Dr. Weaver set about organizing the Scientific Advisory Board. They wanted to enlist the services of enough men to cover a number of scientific fields, but they did not want to get so many that board meetings could turn into debating-society sessions.

The first scientists selected for the Board were: Dr. George W. Beadle, California Institute of Technology, for his pre-eminence in the fields of biology and genetics; Dr. Paul R. Burkholder, Brooklyn Botanic Garden, for bacteriology and botany; Dr. John Bowers, University of Wisconsin Medical School, for Medicine; and Dr. George R. Harrison, Massachusetts Institute of Technology, for physics.

Later the Board was enlarged to include Dr. Maurice Ewing, Columbia University, for geophysics and marine geology; Dr. Farrington Daniels, also of the University of Wisconsin, who had served as an advisor on "Our Mr. Sun," for chemistry; and Dr. Clyde Kluckhohn, Harvard University, for anthropology. With Dr. Weaver representing mathematics, and Dr. Bown representing engineering, this gave a well-rounded representation of the fields of science.

Selecting Other Subjects

EVEN BEFORE THE BOARD held its first formal meeting, the subject of blood and its circulation was selected for the second program in the series, and a group of advisors was selected to work on its production. These included Dr. Maurice B. Visscher, University of Minnesota, as principal advisor; Dr. Chauncey D. Leake, Ohio State University, and Dr. Gordon K. Moe, State University of New York, as associate advisors; and Dr. Allan Hemingway, University of California at Los Angeles, consultant. Mr. Capra started on the preparation of a script on blood and circulation.

When the Scientific Advisory Board met on July 20, 1954, it selected two more subjects for the third and fourth programs—"*Cosmic Rays*" and "*Weather*." Frank Capra then went ahead with the script and production plans for the "*Blood*," "*Cosmic Rays*," and "*Weather*" programs.

In the meantime, "Our Mr. Sun" was privately shown more than 50 times to interested groups, however, including scientists, educators, and students. It was shown to test audiences in New York and Philadelphia; it was tested on closed-circuit television; it was given a "sneak preview" in California as a regular theater feature. The reactions from all these showings indicated that "Our Mr. Sun" was an exceptional production and should have an excellent reception from both the public and the scientific and educational communities when it was telecast.

In the spring of 1956 it was decided to begin the Science Series telecasts that fall. November 19 was set as the telecast date, after the film was reviewed and endorsed with enthusiasm by television network executives.

Since "Our Mr. Sun" was to start the series, it was decided not to include commercials in this program but to take part of the commercial time for an introduction to the entire series by Mr. Craig. Two commercials, each two minutes in length, were part of the "Hemo" telecast, and commercials will continue to be used in future programs.

The agreement with Frank Capra in 1952 called for his exclusive services in television. When he completes the fourth show of the series, on "Weather," he will retire from the project. We are now mak-

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ing plans for more films, so that the series may be continued.

The skill with which Capra combines "live" action with animation sequences and clips from film footage obtained from all over the world makes the Science Series films really unique. Shamus Culhane, who was responsible for the animation in "Hemo the Magnificent," said recently that Capra's use of animation in these films has given an important new significance to the art.

Animation really plays a double role in the programs: On one hand it creates characters who have an integral part in the story—like *Mr. Sun, Hemo,* and *Meteora* the Goddess of Weather. On the other hand, it presents scientific information in

The genius of Frank Capra is firmly imbedded in the Science Series. The inspiring ending of "Our Mr. Sun" is a typical example:

"*What if you don't find ways to use my free sunshine for fuel?*" Mr. Sun asks Dr. Research.

"*Then the machine age is over. We'll have to go back to muscle power, and the half billion population that muscle power alone can support,*" Dr. Research replies.

"*But that will never happen,*" Father Time says, "*because man's greatest power source is his mind. God gave him that, not you!*

"*Without taking a step, he can travel faster and farther than any animal. Without even getting wet, he can out-swim any fish. Without a feather on him, he can fly faster, and higher, and farther than any eagle.*

"*He can send his eyes and ears hundreds of miles into space, where he's never even been. And he's pried open the secret of the atom that he's never even seen. When his fuels run low, men's mind and imagination will meet the challenge and invent undreamed of ways to use the free sunlight that God showers down upon him.*

"*Just remember, somebody must love you very much. That planet you live on is not like all the rest. You're blessed with just the right size, the right temperature, the right atmosphere, the right composition, everything just right to produce the biggest miracle of all — life!*

"*So go ahead. Ask! Inquire! Seek the truth. It's right that you should know, or the Good Lord wouldn't have given you that driving curiosity.*

"*Measure the outside with mathematics—but measure the inside with prayer. Prayer is research, too!*"

And, as the music rises, Dr. Research brings "Our Mr. Sun" to a close with this memorable passage, and we hear his voice over some of the most moving scenes in the film. It is pure poetry:

"*So keep on shining, Mr. Sun!*

"*Thanks for all the radiant riches you shower down upon us.*

"*Thanks for our eyes and all the glories we behold.*

"*Thanks for all the green forests, the deposit of black diamonds, and the deep pools of liquid gold you put in the bank for us.*

"*Thanks for the wheat fields, and all the fruits and flowers you grow for us.*

"*Thanks for feeding our animals, our birds, our insects, and all the fish in the sea.*

"*And thanks especially for the glory and beauty of your 'good mornings' and your 'good evenings.'*

"*In the words of St. Francis: 'Be praised, my Lord, in what you have created. Above all else, be praised in our Brother, Master Sun.'*"

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simple and graphic terms—like the manufacture of the solar battery and the functioning of the heart.

Working out the animation for a Science Series program is a long and careful process. The information to be presented is thoroughly analyzed and digested. Then the animation sequences are designed so that they are both complete in themselves and integrated with each other. After this, the individual drawings are made and photographed on movie film. More than 1,000 drawings are necessary for each minute of the program. More than a quarter of a million drawings were made altogether for "Hemo."

Applause and Appreciation

THERE IS PLENTY of evidence that Capra has suceeded in achieving the twin objectives set up in the original specifications blue-printed for the series.

Nearly 24,000,000 people saw "Our Mr. Sun" on television, and an estimated 35,000,000 viewed "Hemo the Magnificent." From the thousands of letters received from viewers, we believed they enjoyed the film as *entertainment*. These comments ranged from a simple postcard which said "Thanks for these wonderful programs! More, please!" to the very thoughtful engineer in Chicago who sat down at 10:15 p.m. in Chicago, 15 minutes after the Mr. Sun telecast there and wrote to the President of the Illinois Company:

"Ten minutes ago I dialed 'O' and asked for the Supervisor, to make an unusual request. She accepted, incidentally, with the usual unruffled aplomb of all telephone company employees.

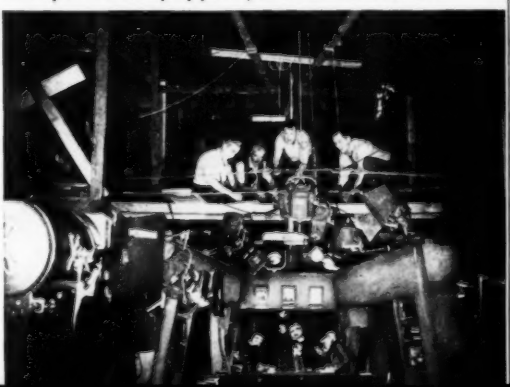
"My request was that she, as the most accessible member of the Bell System, accept my thanks and congratulations on

Frank Capra (left) and Bil Baird, of the famed Bil Baird Marionettes, discuss how the puppets will move during a scene in "The Strange Case of the Cosmic Rays."

the program, 'Our Mr. Sun,' which had just ended. As I explained to her, I had permitted our ten year old twin boys to stay up beyond their usual and normally inflexible eight o'clock bed time to watch the program. I felt that the combination of CBS, Frank Capra, and Bell Telephone would produce a worthwhile program. The reality far exceeded my expectations. As a graduate engineer, I knew many of the facts presented, but nevertheless my attention was held as unwavering as was that of our two very curious and atomic-age-wise future engineers.

"Television has been much criticized and much maligned. Too often the charges are not ill-founded. At such times we are grateful for a simple device which constitutes our family counter agent – the *off*

The small stage for the puppets, used in "Cosmic Rays." Four experts are ready to manipulate the puppets for the next scene.



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switch. There are other times when television rises to profound heights, and 'Our Mr. Sun' ranks as one of the greatest. At such times, we are glad that there is also an *on* switch on our set.

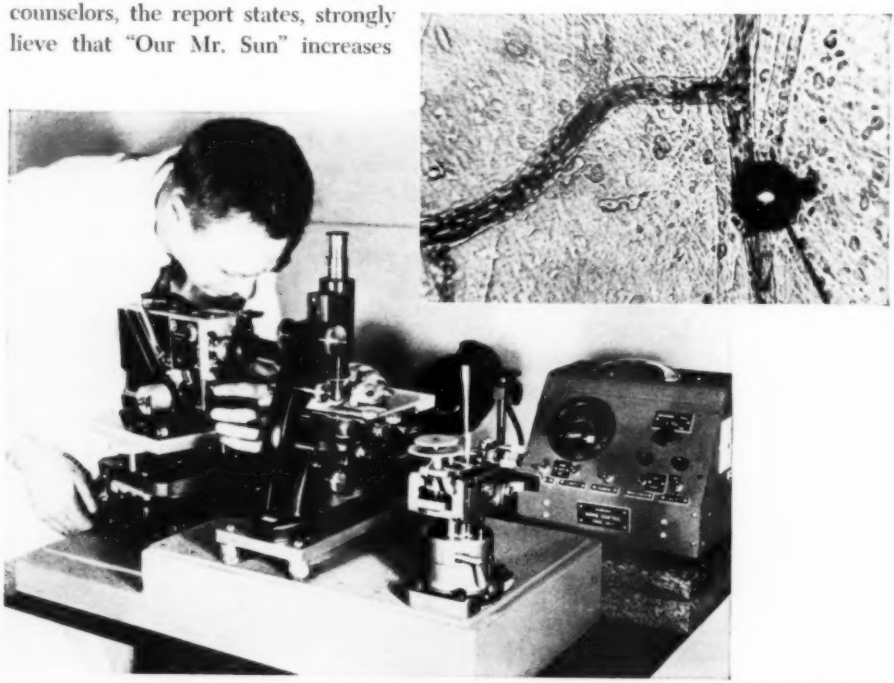
"Congratulations and thank you."

A report from the Audio-Visual Materials Consultation Bureau, College of Education, Wayne State University shows that "Our Mr. Sun" is useful as an educational teaching tool from the fourth grade through college in several science curriculum areas, in social science, and in the humanities. Teachers believe the film to be especially valuable in showing interrelationships among many fields of science and in creating a desire for pursuing the study of the sciences. Vocational guidance counselors, the report states, strongly believe that "Our Mr. Sun" increases the stature of science as a profession in the eyes of students.

One high school science teacher puts it this way:

"I've never known another educational film to make such a hit, with students or teachers."

He explained that his school made the film a specific teaching tool. It was shown 31 times by five science teachers to 840 students. In his classes, he first showed the film, and followed with a discussion period and a short test. Then he showed the film a second time and followed with a comprehensive test. After seeing the film for the 10th time, he said he was never bored and learned something new each time.



Dr. George P. Fulton, of Boston University, adjusts camera used for making microscopic motion pictures of blood flowing through the arteries and veins in the cheek pouch of a hamster anesthetized under the microscope. Insert at top right shows the greatly magnified picture as seen in "Hemo the Magnificent."

More than 400 prints of "Our Mr. Sun" are in constant use throughout the nation, mostly in schools, and the Associated Companies are continuing to order additional prints as demand continues to increase. A slightly modified version of the film, especially tailored to fit into 40- or 45-minute classroom periods, is now available. The modification consists of removing about two minutes from the TV version of the film and dividing it into two parts, at a point which does not interrupt the teaching sequence if Part II is shown at a later classroom period. This allows time for the instructor to give an appropriate introduction for each part and conduct a short discussion afterwards. Similar revisions will be made in "Hemo."

Thousands of words in letters of thanks attest to the film's popularity with teachers. In response to a direct-mail piece sent by the National Science Teachers Association to science teachers throughout the country, more than 400 letters were received from the teachers. Most of them said the film was an excellent teaching aid. Many said the Bell System should be commended for making it and encouraged to do more of the same. Here are some typical comments:

"We found that many parents joined their children in talking about the film at home."

"Our 9th grade science class has just completed a study of the Solar System, and I must say the film was very timely."

"Many of my students saw it on television and exclaimed about it all the next day."

Plans are being made for a repeat showing of *Mr. Sun* on a national television network late in 1957 as well as a first-time showing of either "The Strange Case of the Cosmic Rays" or "The Unchained Goddess." We also hope to set up a schedule of several shows during 1958.

Extensive research has been going on under the aegis of the Advisory Board for the past two years in a number of fascinating scientific areas. Much work already has been done in preparation for the new films, and scientific advisors have been selected for the subjects under consideration. The subjects will range across all the broad scientific areas. One on "Language," for example, might cover anthropology, physics, and linguistics of speech. One on "Probability," the more abstract areas of mathematics. Others like "the senses" or "genetics" would reach into physiology and chemistry. Some of these may never go beyond the preliminary research stage; others may go on to be scripted and produced.

All indications—the reaction of the press, the letters from viewers, the endorsement by organizations, the enthusiasm of educators, and the results of our own opinion surveys – lead us to believe that in the months and years ahead the Science Series may rank as one of the outstanding public service activities of the Bell telephone companes, as well as a rewarding advertising venture.

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Historical development of the telephone and scientific principles underlying the art of telephony are strikingly displayed in the Nation's Capital

NEW TELEPHONE EXHIBIT IS PRESENTED TO SMITHSONIAN

EUSTACE L. FLORANCE

Secretary and Treasurer, CHESAPEAKE AND POTOMAC TELEPHONE COMPANIES

SINCE MARCH 11, 1957, there has been available to the millions of people who visit the Smithsonian Institution in Washington a telephone exhibit which is brand new, comprehensive, historically and scientifically accurate, and – on top of all this – fascinating in its clear explanations and push-button demonstrations.

The exhibit represents close coöperation between the Bell Telephone System and elements of the United States Independent Telephone Association – with, of course, the advice and general guidance of the Smithsonian staff. And since the Institution (with a capital I) is a national institution (with a small i), it belongs to all Americans, who can look with pride on this authentic display of the instruments and the service which have contributed so importantly to the development of their country.

The telephone exhibit contributes specifically to the purpose for which the English scientist James Smithson made his magnificent bequest. For in leaving his entire estate to the United States, he defined his motive in part as "for the increase and diffusion of knowledge among men."

Congress accepted the bequest, and in 1846 established the Smithsonian Institution, designating its membership to be the President of the United States, the Vice President, the Chief Justice, and the cabinet officers. In addition, Congress provided a governing Board of Regents composed of the Vice President, the Chief Justice, three Senators, three Representatives, and six citizens. The executive officer of the Institution is its Secretary, now Dr. Leonard Carmichael, the seventh incumbent and a distinguished educator, psychologist, and former president of Tufts College.

Out of this beginning, 111 years ago, has grown a complex of cultural, historical, and scientific enterprises which by enlightening the human mind has helped to move mankind away from superstitions and insecurity onward to understanding and well-being.

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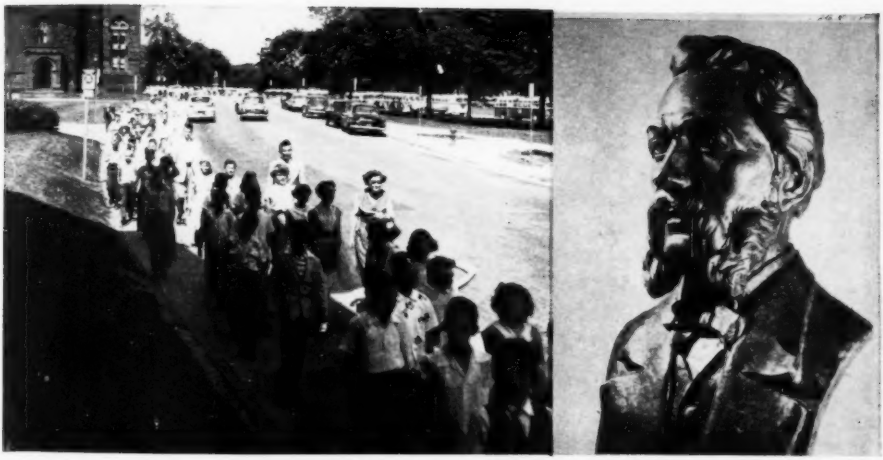

From all parts of our country, children — and their elders — flock to see and study the treasures of the Smithsonian Institution. Right: a bust of Bell as a young man which stands at one end of exhibit.

Prominent today in this group of establishments are the art, industrial, and natural history exhibits of the National Museum; the glorious collections of paintings, sculptures, and other works in the National Gallery, the Freer Gallery, and the National Collection; the large assembly of aircraft and related objects, historically and technically important, of the National Air Museum; and the Zoo, with its astounding population of birds and beasts that amuse millions each year.

The National Gallery of Art contains the Andrew Mellon and other collections; the Freer Gallery contains collections of Near and Far Eastern works and the

At the opening ceremonies: l. to r., Dr. Robert P. Multhauf, head curator of the Department of Engineering and Industries; Dr. Melville Bell Grosvenor, grandson of Mr. Bell, president of the National Geographic Society, and a director of the Chesapeake and Potomac Telephone Company; and Dr. Leonard Carmichael, secretary of the Smithsonian.

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Reproduction in miniature of the garret at 109 Court Street, Boston, more than 80 years ago. The electrical shop of Charles Williams Jr. was located at this address, and much of Bell's experimenting was carried on in this open attic space.

works of Whistler; the National Collection of Fine Arts is a fine and varied assembly of paintings and objects in the custody of the Smithsonian.

But the Institution is far more than a national shrine in which to preserve and display the achievements of man's inventiveness and talents, or specimens collected from nature.

Its Bureau of American Ethnology has for three quarters of a century pursued studies of the American Indian and is a clearing house of information for all interested in ethnology and archeology.

The Astrophysical Observatory's objective is the continuing measurement and recording of the sun's radiation and it also is investigating the possibility of capturing solar heat for power.

The Division of Radiation and Organisms is searching for answers to questions about the part that sunlight plays in the maintenance of life on this earth.

Barro Colorado is a jungle covered island in Gatun Lake, in the Panama Canal Zone. Under the administration of the Smithsonian, it is maintained as a preserve equipped with laboratory facilities for scientific research, biological and other, when a primeval and tropical setting is required.

Joseph Henry, the discoverer of important principles concerning the behavior of electricity and a friend and counselor of Alexander Graham Bell, was the first secretary of the Smithsonian. He conceived and developed a system to promote the international exchange of scientific and governmental publications among foreign and domestic institutions, libraries, and individuals. The system grew rapidly, became a Federal function administered

by the Smithsonian, and today a million or more packages of documents pass through the International Exchange Service each year on their way to or from foreign lands, ultimately to reach their destinations in fulfillment of Smithson's hopes for the "diffusion of knowledge."

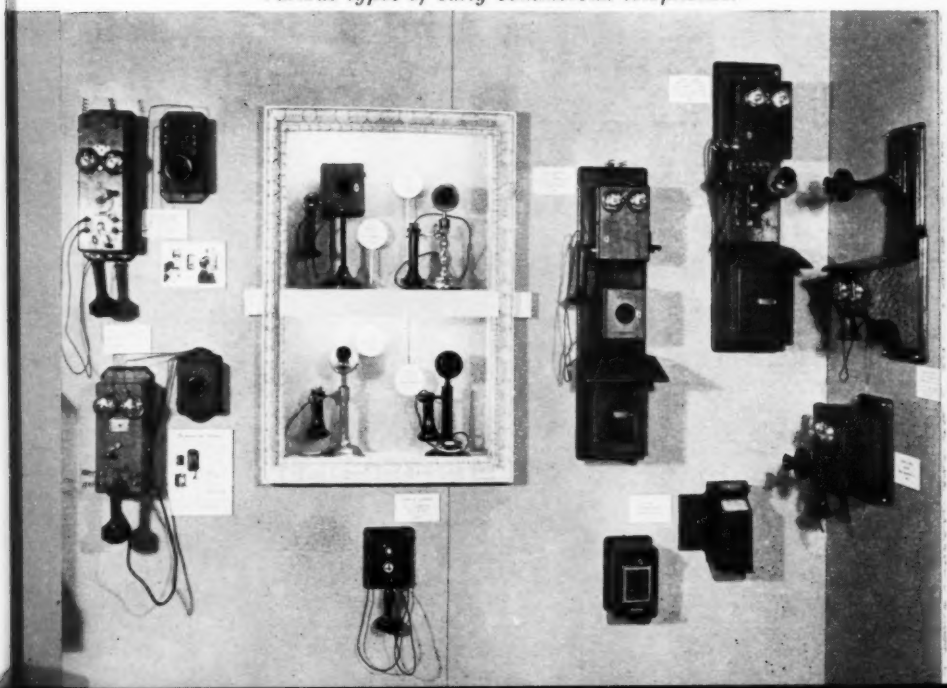
About the time the telephone had become a familiar object, the collections of the Smithsonian had outgrown their home on the Mall. By 1882 an Arts and Industries Building was ready to shelter and display precious mementos of American history, artifacts of American industry, and a record of an expanding technology.

In the years that followed, the telephone found a place in this distinguished company. There is satisfaction in the recollection that Alexander Graham Bell, the inventor, and Gardiner Greene Hubbard, his father-in-law and financial backer, were Regents of the Smithsonian in their day and that George Maynard, founder of the telephone business in the City of Washington, later devoted twenty-two years to the advancement of the Institution as the curator of its electrical division. Hubbard served from 1895 to 1901, Bell from 1898 to his death in 1922, and Maynard from 1896 to 1918.

Mr. Bell himself presented early models of his works and documents of great interest to the Smithsonian, as did Elisha Gray and other inventors. But these, by themselves and unorganized, were insufficient to tell a full story of the origin and development of an instrumentality that in a life span of 81 years has produced a nation-wide industry and become an indispensable tool in the life of today. Here lay an opportunity to tell the story to millions of Americans who visit the capital of the nation, in a setting charged with the spirit of history and the arts and sciences.

Some five years ago the A. T. & T. Co. made offer to the Smithsonian to design and provide a comprehensive exhibit treating of telephony, and the offer was gladly accepted. Since then the work has gone forward steadily under the direction of a

Various types of early commercial telephones.



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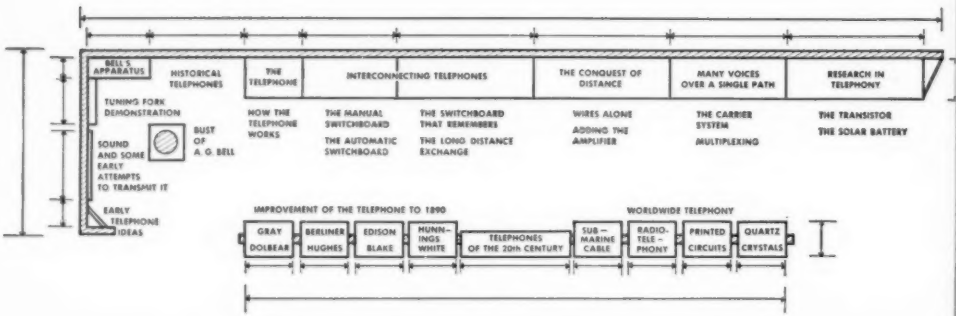
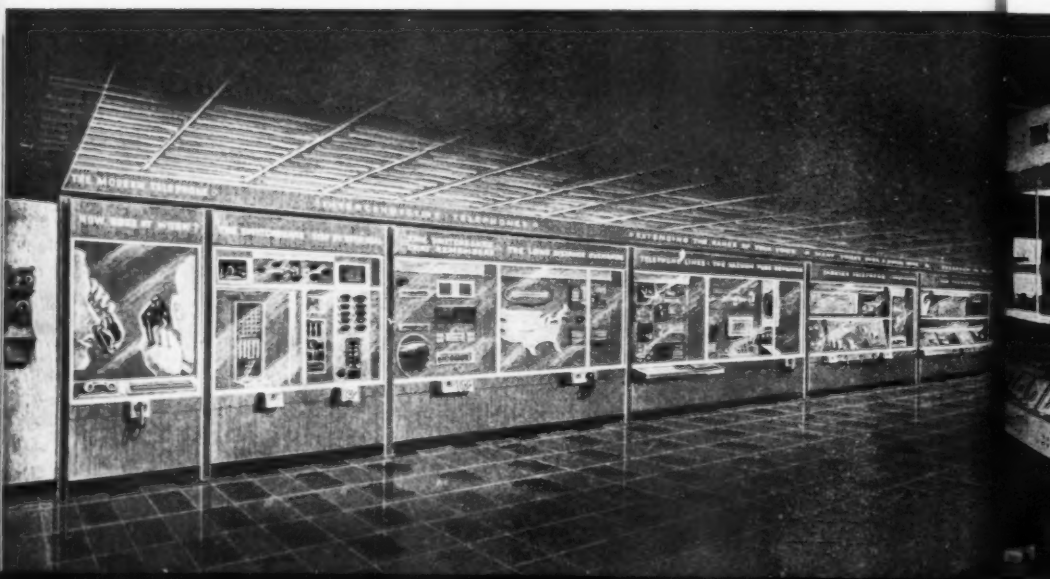
Concepts and plans: at left, sketch for historical section, where stands the bust of Bell; center, unified floor plan of balcony exhibit space; bottom, displays featuring elements of present-day telephony.





committee which includes representatives of A. T. & T., Bell Telephone Laboratories, Long Lines, Western Electric, and the Chesapeake and Potomac Telephone Company. As the project went ahead, it benefited greatly from the interest and ability of Dr. Robert P. Multhauf, head curator of the Department of Engineering and Industries of the Smithsonian, and Mr. L. L. Oliver, superintendent of buildings and grounds.

All these activities came into focus and reached their climax when, on March 11, James B. Morrison, President of The Chesapeake and Potomac Telephone Companies, and Leon F. Roberts, Director of Information for the United States Independent Telephone Association, presented the finished exhibit on behalf of the telephone industry to Dr. Carmichael, Secretary of the Institution. Dr. Melville Bell Grosvenor, grandson of Alexander Graham Bell, President of the National Geographic Society and a Director of the C. & P., cut the ribbon that formally opened it to the public.

The telephone story is told in fourteen chapters, each filled with things to watch, to hear or to read. It starts with Alexander the Great and his megaphone. It recognizes the work of many investigators which contributed to knowledge of sound, and progresses swiftly and colorfully through the invention of the telephone, the successive developments in the art, to electronic miracles of the day – transistors, solar batteries, and the like.

The titles of the chapters give but a bare idea of the scope of the tale that is unfolded.

"Early Telephone Ideas" – "Sound and Some Early Attempts to Transmit It" – "Quartz Crystals in the Telephone System" – "Miniaturization and Printed Circuits" are four of them.

"Alexander Graham Bell" is a chapter that pays tribute to the man and his work.

The contributions of eight inventors to the art are acknowledged in a chapter "Improvement of the Telephone to 1890." They are Elisha Gray, Francis Blake, Henry Hunnings, Emile Berliner, David Hughes, Amos Dolbear, Thomas Edison, and Anthony White. All of these in their own manner found the way to a better transmitter.

The accomplishment: a general view of the telephone exhibit, as executed according to the plan on the opposite page.

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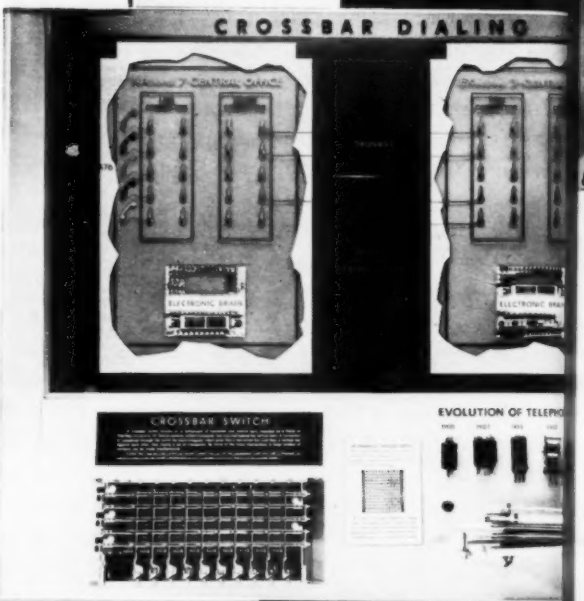
What makes the telephone talk.

Crossbar dialing – the switchboard that remembers.



Power from the sun: the solar battery.

ANIMATED DISPLAYS

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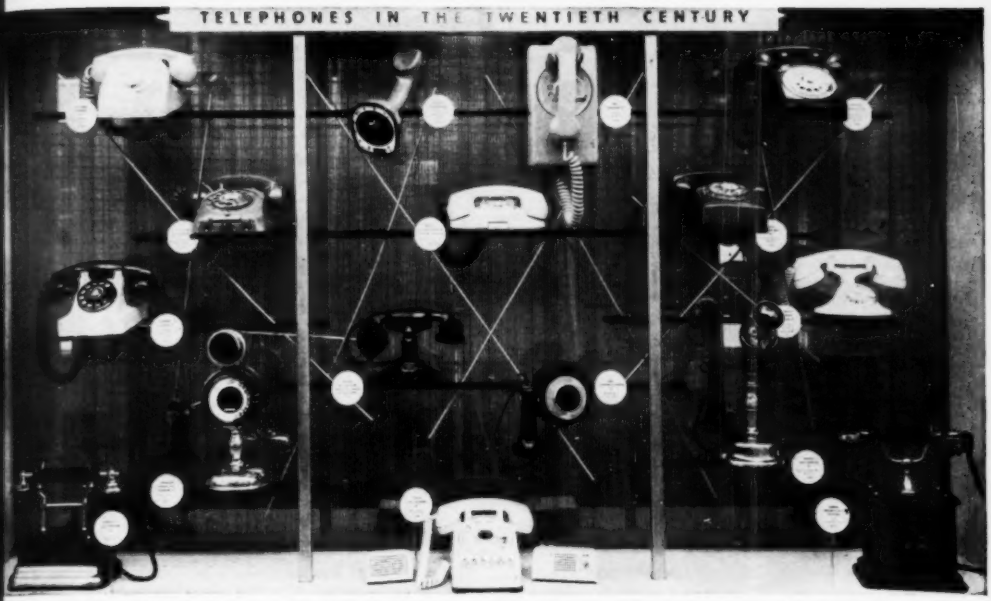

Twentieth century telephones from many makers in this country and abroad.

"Early Commercial Telephones" takes one back to the horse and buggy days, while "Telephones of the Twentieth Century" – 16 of them, selected samples from several manufacturers – sparkle with color and show the evolution that has made the instrument ever more handsome and handy.

"How the Telephone Works" is a visual demonstration of how the transmitter and receiver obey the commands of the human voice.

"Interconnecting Telephones" presents local manual, step-by-step, crossbar, and toll switching.

How the obstacles to the transmission of suitable electrical currents over longer and longer distances by wire and cable were overcome, the loading coil, the vacuum tube repeater, are explained in a chapter called "Conquest of Distance."

"Many Voices Over a Single Path" tells of and shows the principle and function of carrier systems.

Two units entitled "World-Wide Telephony" recount the story of transoceanic service; one radio telephony overseas, the other cables under the seas.

Solid state physics and its family of semi-conductors; the nature and role of the transistor, and the Bell solar battery are the topics of "Research in Telephony."

Taken together, the fourteen chapters tell a story that is uniquely genuine, interesting, and informative. They pay homage to dedicated men who have helped to make the world what it is today. It is fitting that the ideas and accomplishments of these men be recorded and displayed to inspire others. Indirectly, the exhibit pays homage to a public service that has a great role in the fulfillment of James Smithson's ideal, "the increase and diffusion of knowledge among men."

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This country's telephone industry has to make its plans on the assumption that continental United States may be subjected to attack with nuclear weapons

ASSESSING OUR PART IN DEFENSE PREPARATIONS

GEORGE M. DEAN

Assistant Vice President, DEPARTMENT OF OPERATION AND ENGINEERING, A. T. & T. CO.

TAKING STOCK, trying to measure the Bell System's present position in the broad picture of the nation's preparation for defense, is a serious matter—and it is far from easy.

By what standard of measurement may we judge not only our responsibilities to the Armed Forces but our duties—our obligations, indeed—to all the citizens, who have learned to depend on the telephone for so many of their needs? And if such a frame of reference were to be found, could telephone people tell where we stand now in relation to what is going on in this field, or how far along our several programs should be?

Can definite answers to such questions be found? Can there be a detailed program linked with a specific time schedule?

No.

When the United States recognized the possibility that it could be subjected to attack by atomic bombs, the so-called nominal bomb was the threat—the equivalent of perhaps 20,000 tons of TNT. Today's bombs may have a thousand times that power.

The bombers then in view—such as the Russian TU4 or the American B29—could deliver their loads at roughly 300 miles an hour. Today intercontinental ballistic missiles loom, to travel thousands of miles an hour.

Then stockpiled weapons, and the airplanes for delivering them, threatened this country with a strike which, in terms of that day's defense capabilities, might result in major destruction to a dozen cities. Now there is the grave possibility that, even despite greatly augmented defense systems, mega-ton weapons could strike a hundred important American cities.

That's today's outlook—and it isn't pretty.

What comes next? How do telephone people plan and carry out programs in the face of it?

More Haste – Less Speed

BECAUSE OF all these unknowns—these continually changing basic assumptions – we have had no reasonable alternative but to move cautiously. We could not, with any degree of logic, rush ahead and quickly

A blast-resistant building. This dial switching center is designed to minimize the effect of nuclear attack.

do all those things that, at any particular moment, seemed to be the most desirable on the basis of assumptions current at the moment. In some instances the action that looked like the best possible answer has later turned out to be a complete "bust." We can't afford to run down blind alleys or make mistakes. They are too expensive.

Nor are we alone in our dilemma. One really clear measure we can find is to compare where we stand with what is being done by other industries and by the Government. As a public utility, we must have the support of our customers—the general public—and of the Government regulatory bodies for what we do. After all, they decide whether we have the money to pay the cost of any plan. We can't move 'way out ahead of others, nor can we lag 'way behind. Our job is to keep pace with steps taken by other industries and government to provide and safeguard the communication needs of our nation's defense effort.

Using this relationship with others as our reference point, and making the best comparison we can based on discussions with people in other major industries and in Government, we can conclude with confidence that, in most respects, we are doing about right. We have gone further than most in matters relating directly to the protection of service where the importance to defense is paramount. In other respects there are those who are moving faster than we are.

In trying to develop plans for possible wartime conditions, we are forced to consider as possible three fundamental types of situations. Two of these we know a good deal about from having been through them; the third is new.

A Throw-back to Korea

ONE TYPE of situation that is possible, and from recent history seems the most probable, is generally that encountered during the Korean conflict.* The policies and aims of the Communist nations – the current Middle-East situation is a good example– point up the possibility of a limited war in some area of the world. The size of the effort involved could range between rather wide limits, but the general effect on the telephone business would be about the same.

A substantial part of the industrial production of the country would be diverted to military production. Demands for telephone service would increase even above the current high levels and, at the same time, shortages of basic materials would result from diversions to military production. Copper, aluminum, steel, nickel, and probably other materials would be controlled and supplies would be allocated by a Government agency.

A telephone executive who is now on loan to the U. S. Department of Commerce and working in the Business and Defense Services Administration.

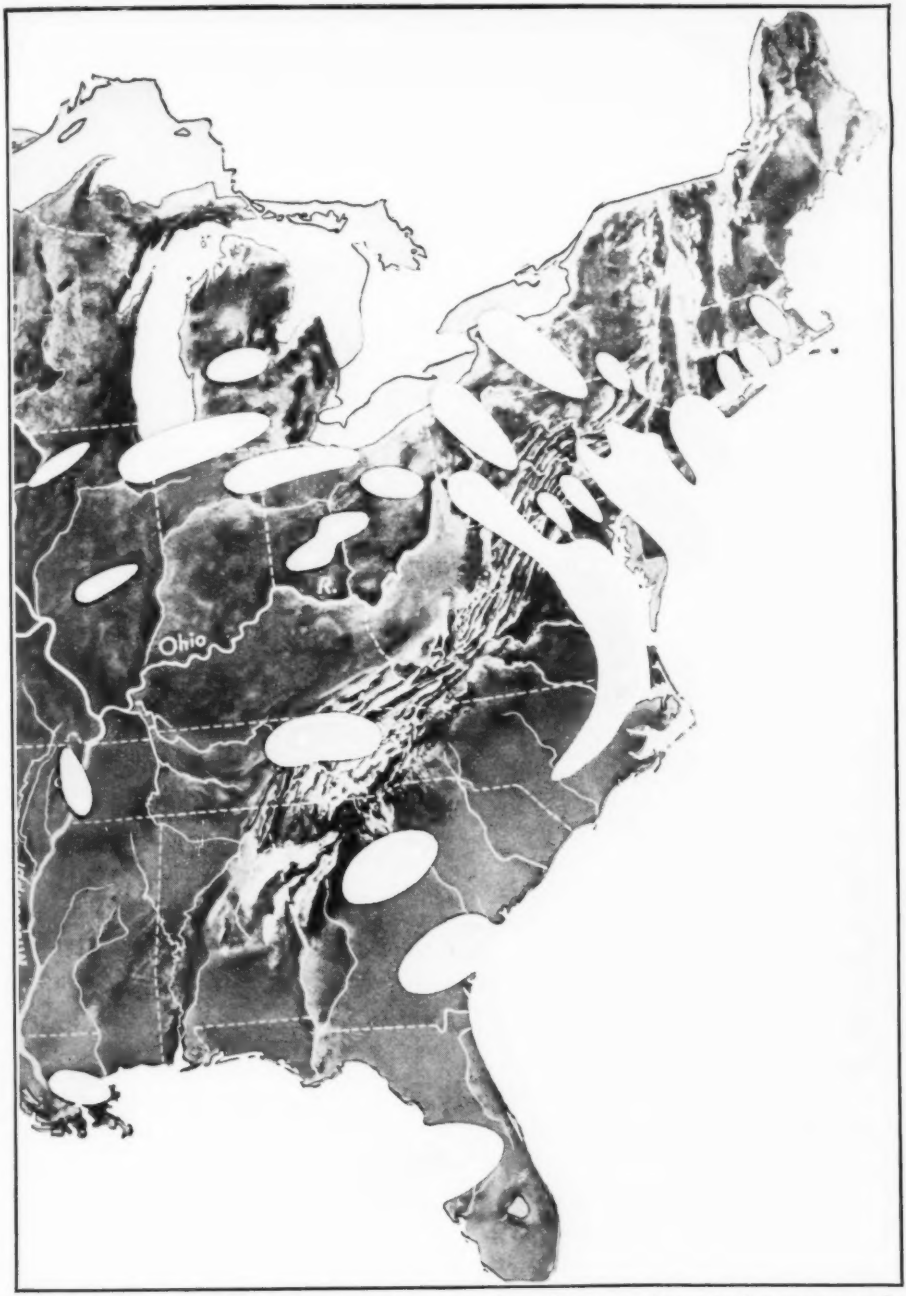
As a result of coöperative efforts of the industry and Government agencies, there now are fully developed standby control orders that would permit more rapid adaptation to the situation than was possible in 1950. Then, orders had to be developed and organizations set up to administer them after the need occurred. Today, a number of telephone people have gained experience in what will have to be done by working in the Business and Defense Services Administration of the Department of Commerce on a loan basis. These people make up an executive reserve which can be called upon to expand the Government organization almost overnight.

A World-War-II Situation

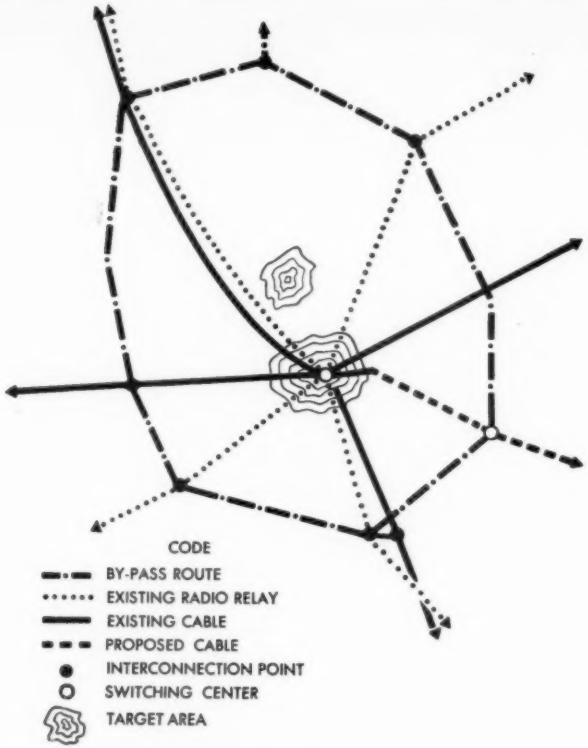
WE MUST take into account the chance that there could be another world war involving all-out efforts of most of the major nations but not including military attack on continental United States. Such a situation seems highly unlikely to exist for long, because it would involve mutual decisions by the combatants to dispense with the use of nuclear weapons against industrial or civil population targets. However, it is possible that this situation could exist as one stage of development from the Korean-type situation to the direct attack on this country.

In most of its effects on the telephone industry, this situation would be essentially an extreme example of the Korean type.

Studies have been made of the material and equipment requirements of the telephone companies under these conditions, and plans have been made, jointly with the Government, to cover the allocation of



A dreadful pattern: the white dots show missile strikes in a theoretical atomic attack, and the shades of yellow represent degrees of dangerous wind-borne radiation fall-out.



Plan for interconnecting existing communications channels which radiate from a target city. Such a plan would enable through traffic to by-pass the city if it should be wiped out.

critical materials and set up priorities for new telephone service similar to those in force during World War II. Through the coöperative work of the telephone industry, the Telecommunications Planning Committee of the Office of Defense Mobilization, and the Federal Communications Commission, rules governing the priority use of message telephone facilities have been developed. These have been adopted by the telephone companies on a voluntary basis so that no time would be lost in making them effective.

Another measure directed primarily at this type of situation is the working out between the Western Electric Company (manufacturing and supply branch of the Bell System) and the Department of Defense of standby orders for the production of military equipment up to the maximum level possible consistent with meeting the most essential communications needs of the civilian users. These plans make possible rapid conversion to military production without interruption that would cause temporary lay-offs for people working in the shops.

It Can Happen Here

THE THIRD TYPE of situation for which we must plan contemplates the possibility that nuclear, chemical, and biological weapons

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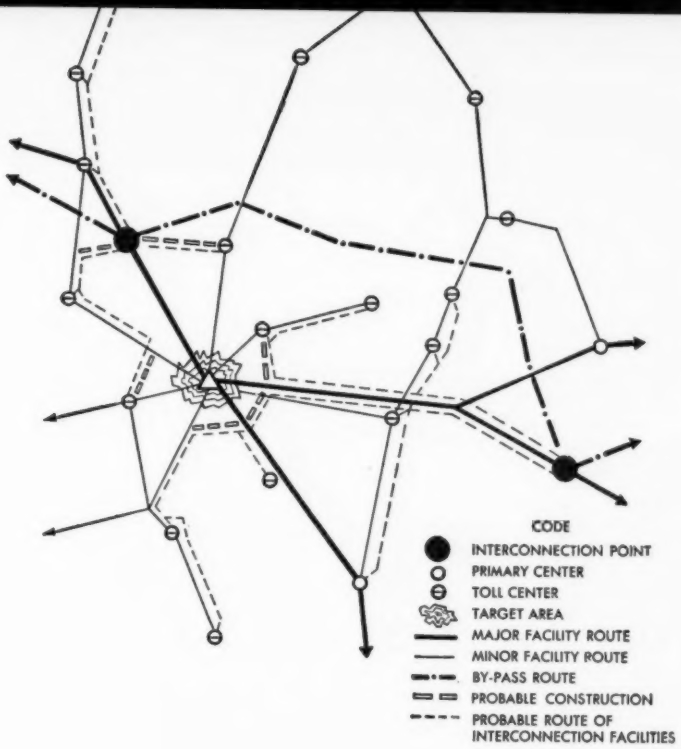


Plan for routing communications channels to by-pass a city which would be a probable target for nuclear attack. This would enable long distance traffic which would normally be routed through the city's downtown LD center to pass to its destination uninterrupted.

might be used in an attack on the Continental United States.

Perhaps the best method for our nation to reduce the chance of such attack is to take all practicable steps to make the benefits to the enemy low in comparison to his cost. SAC (Strategic Air Command) is continually on the alert to retaliate—to exact a penalty that would far outweigh the benefits to an enemy. All of us in industry can help to make this type of attack unprofitable by taking steps to greatly increase the number of bombs or missiles that would have to be delivered against us to put us out of business. If all industry and the entire population could be dispersed uniformly all over the United States, no enemy would drop bombs on us or shoot missiles at us. Such complete dispersion would itself take the profit out of an attack. The damage done by a bomb or missile would amount to much less than its delivered cost.

Practically, our nation can't spread its industry and people out completely—though we can do a lot by moving steadily in that direction. Applied to the telephone business, the same thought can be expressed in a different way to get a useful planning concept.

Telephone service can only be given at the point where the customer is located. An automobile or a gun can be made at any place and the finished product transported to where the user is. Telephone calls

can be made, the connections established, only where the people who want to talk are located. Hence, if everyone else dispersed, the communications would automatically have to follow them. That this process is going on at a fairly rapid rate is evidenced by the tremendous growth of our plant and service in the suburban areas surrounding the cities.

How then do we best protect telephone service? The principle is relatively simple. The objective is to arrange the plant—the local and long distance offices in particular—so that destruction of a particular office will interrupt service only for those users whose need for service was eliminated by the same event that destroyed the telephone office. Applied to trunk routes, the principle is best utilized by arranging routes so that essential communications cannot be interrupted as a by-product of the destruction of other targets. Route essential services over two or more geographically separated facilities. Now we begin to approximate the dispersal situation where the amount of destruction to essential communications is small compared with the cost of the weapons that would have to be expended on them, and them alone, to accomplish effective damage.

Express, By-Pass, and Avoidance Routes

A GREAT DEAL of progress has been made in the Bell System, and much more is being done, to apply these principles—express,

Cable vault as shelter area. Such underground locations offer protection against blast and radiation.

A rescue squad, typical of those which telephone companies are training for operation after a nuclear attack.

by-pass, and avoidance routes—to intercity trunk routes. The A. T. & T. Co's Long Lines Department and the Pacific Telephone and Telegraph Company – which provides intercity facilities on the Pacific Coast – have undertaken a program of building by-passes around likely target areas. This program has as its objective that essential communications between any two points in the country, themselves unbombed, can be maintained in the event of a major enemy attack on the continental United States. In other words, the objective is that essential telephone communication between points in the United States will exist no matter what happens to the cities, military bases, and other targets in between.

This purpose probably is not completely attainable and, even if it were, the plan doesn't absolutely protect against interruption of essential services; but it does prevent such a thing happening as a by-product of other destruction desired by an enemy.

The most difficult problem has been that of identifying which geographical areas are likely targets. A start was made on the basis of the list of critical target areas provided by the Federal Civil Defense Administration. Recently the list has been expanded, and studies are now under way to determine what more should be done to further increase the likelihood that essential telephone services will be available in the event of war.

Terminal Area Protection

WE HAVE NO very acute problem of protecting the local telephone service, because the local telephone office generally serves an area roughly comparable in size to the area of destruction of a large nuclear weapon. Hence, if we lose the office, we probably no longer have a need for the service it provided.

The situation is less simple when we consider long distance centers. Usually we find a large switching center (controlled switching point) about in the center of a large metropolitan area—itself a likely target. Surrounding this metropolitan area there are usually a number of smaller long distance offices largely dependent on the major downtown office for their access to each other and to the world in general.

The downtown long distance office is almost certain to be put out of business by a nuclear attack on the city as a center of population and industry, while the outlying centers may survive. Applying our fundamental principles of protection to this situation, therefore, we see the need for arrangements that permit access to the general intercity network independently of the downtown office.

With this hazard in mind, a number of important long distance switching centers have been installed outside of the major danger areas. The construction of by-pass and avoidance routes is giving us many telephone test centers that serve as points of access to the intercity network well outside danger areas.

To determine the possibility of carrying the program further, all companies are currently making a System-wide study to determine what construction is involved and what the cost might be. Just how far and how fast we can move on such a general program cannot be determined until these studies have been completed.

Other Measures

WE HAVE DESCRIBED in some detail the area of defense activity commonly thought of as "service protection." Steps have been taken and studies are in process toward many other phases of broad planning. To indicate the scope and range of these activities, it is worth looking at a few of them.

To provide for the continuity of the corporate structure—that is, the legal existence of the business—the by-laws of the A. T. & T. Co. have been amended and plans have been made so that, if only one or two members of the board of directors should survive an attack, they could appoint others to the board and legally take steps to keep the business of A. T. & T. and subsidiaries going. The Associated Companies are in the process of reviewing their corporate planning in the light of their individual States' legal requirements.

First aid supplies have been provided in most buildings and first aid training has been given to large numbers of telephone people. Warden organizations have been set up in most telephone buildings.

A number of telephone people have had training in rescue operations and more are being trained.

The search for economical and practical meters for measuring nuclear radiation levels and doses is still going on. The possibilities look much more promising than a year ago. Meanwhile, most of the Associated Companies have purchased a few meters and have undertaken to train some people in their operation and in interpreting readings into action. We shall be ready to take advantage of them when meters become available in quantity.

A radiological survey team, using a detection meter to establish a safe approach route for a communications line.

If space and our readers' patience were unlimited, we could mention a good many other phases of protection of service and personnel. In many of the areas, we cannot move independently of the communities where we live and work. We cannot complete evacuation or shelter plans, for example, until we know what the local Civil Defense plan is and know that it is organized and effective. However, we have designated the best shelter locations in our buildings in the likely danger areas—about as far as we can go on our own.

Department of Defense Communications

THE THIRD TYPE of planning situation, assuming this country is bombed, carries other implications that we are wise to fully appreciate and consider. These implications make our measures for protection even more urgent from the standpoint of the defense of the nation than do our normal telephone services.

The military services have for many years obtained at least a part of the continental communications they need from the commercial telephone companies. Until the dawning of the nuclear age and the possibility of direct attack on the United States, these services were primarily for administrative and supply purposes. They were not for tactical operational work.

With the new situation, the military has faced the need to provide very extensive

facilities for defense of this country against airborne weapons. They have also had the job of setting up a system for massive retaliation and methods of administering the business of war with a battlefield right here at home. The largest single-purpose system is that being provided for air defense, the SAGE (Semi-Automatic Ground Environment) System. Its associated communication channels are essential to this system. Under certain circumstances, a very short interruption in these channels could make the difference between an enemy bomber being shot down in a corn field and an H-bomb falling on one of our cities.

The speed and power of the weapons involved and the flexibility of command needed to meet the situation have tremendously increased the quantities of rapid communications and their importance. As Major General Gordon A. Blake, when Director of Communications-Electronics, USAF, said in 1955:

"When the concept of SAGE was developed, five years ago, one of the basic assumptions tacitly made by the scientists was that such a system was feasible in the continental United States only because of the existence of a network of commercial communications land lines that has no counterpart in any other part of the globe. Today this network, operated by the Bell System and the Independents, represents a private capital investment of nearly sixteen and a half billion dollars. Since 1945 it has been growing at a rate of one billion

Establishing a communications center for emergency forces at the periphery of a damaged area. Several such centers might be needed at each such disaster point.

dollars a year. And the demand from the public for better and more extensive service indicates that this rate of growth will increase, rather than decrease, in the foreseeable future. As an assistance to national defense, particularly in the air defense aspects, the telephone system is becoming a greater national asset each year."

Under the situation visualized, all civilians will be in the "front lines" along with those in uniform. But most civilians can "crawl in a hole," if they can find one, and stay there until the attack is over. We in the telephone business can't do that – at least not all of us. We have the job of keeping one of the fighting tools working: communications, a tool essential to the functioning of the weapons.

Part of the Defense System

WE HAVE BECOME a real part of the defense system. We must plan for possible events and strengthen our ability to cope with them. We have the same moral obligation to do our job as if we were in uniform.

Obviously, the most important part of the job is to provide arrangements so that, to the maximum extent practicable, these essential communications will work without human attention during an attack. Where people would or might need to take some action – for example, rerouting circuits at testboards, or starting emergency engines – they should be protected.

The best way to provide such protection is to arrange matters so that such action need be taken only in locations that are not likely to be targets. In that way the people with essential duties would be just as safe as anyone else. The best defense for people against nuclear weapons is to be some place else when they explode. Hence, present planning contemplates that people in the likely target areas would follow the directions of the Civil Defense authorities in deciding whether to try to get out of the area or to utilize the best available shelters. Those already outside would stay on duty as needed–for there is no place they could run to that would be any safer.

The companies have already made provision so that those customers who may have a real need for operator assistance during an attack can be served from switchboards well outside the target areas. Incidentally, as the DDD (direct distance dialing) program grows, the need for such operator assistance will gradually diminish. With the completion of the present program for the by-pass and avoidance routes, it is planned that control testboards for essential private-line services will be located outside the target areas.

Finale

WE HAVE TOUCHED HERE only the high spots in our defense activities. Obviously, much of the work is classified information and cannot be discussed. It should be equally obvious that the job will never be finished as long as the hazard exists. Attack and defense capabilities are continually changing, and plans must be revised accordingly. As the military services expand, the problems grow along with the degree of reliance the country is placing on us.

The day you find a telephone company defense coördinator unworried, because he has his job under control, you will know that the specter of military attack on this country has disappeared. May it be soon! Meanwhile, the support of all telephone men and women is needed to do the defense job.

Not to teach people to "write" but to help them to communicate better is the objective of one company's courses in this fertile field

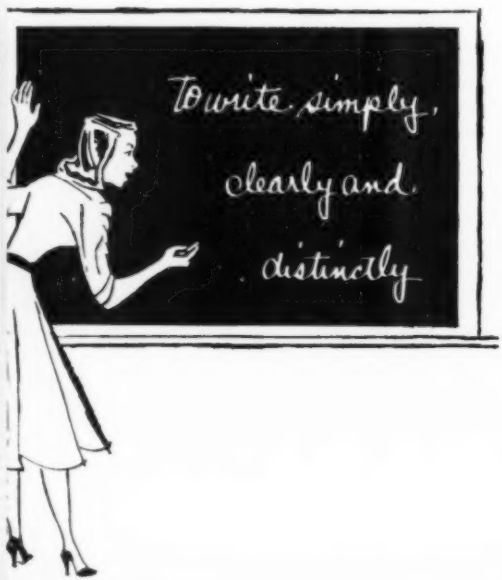
BETTER BUSINESS WRITING

HEATHER PETO

Administration Staff Assistant, PUBLIC RELATIONS DEPARTMENT, THE PACIFIC TELEPHONE AND TELEGRAPH COMPANY

NOW AND THEN every business needs to take a look at its tools. Are they doing their best job? Are they sharp enough, fast enough? Or are they so out of date they waste time and slow production?

Business writing is a tool of industry. True, it works behind the scenes. But before trucks, pole diggers, comptometers, or switchboards swing into action, somewhere there must be a mass of words telling how, when, where, and why.



Man has always been a talkative animal. In today's electronic age, his output of words is astronomical. Our economy and all the units in it literally run on words.

When we talk about writing in our own telephone business, we are describing quantity production. One of our biggest continuous writing jobs, the Bell System Practices, alone comprises volumes on volumes. In the System, we write 30 to 40 million letters and notices a year to customers. And all the other paperwork that is part of every department's daily job, makes mountains of written words.

What about these words? Are they being produced efficiently? Do they serve their purpose well? Are they all necessary? Can we work to improve them, just as we do any other tool we use?

IN 1952 we in Pacific Telephone began taking a serious look at the writing done in the company. The first result was to publish "Mark to Arthur to You," a booklet suggesting ways of writing friendlier, less formal letters and memos. It made an instant hit with our people. It traveled ex-

tensively around the Bell System and found its way into other industries.

Since then, the Pacific Company has moved into a regular program of improving business writing, with some very heartening results.

The essence of the program is to teach telephone people how to write simply, clearly, and directly. You do this by using shorter sentences, fewer words, and everyday language.

One point should be strongly emphasized here. We are not trying to teach people to "write". We are only trying to help them communicate better whenever they use the written word. Our objective is not craftsmen but communicators. And there are no rigid rules – only some well tested principles.

The main principle of better business writing is so simple it seems self-evident. It is: "writing the way you talk." Sounds easy, doesn't it? It would be, too, if people didn't have years of deeply rooted habit and conditioning to overcome. This is true not only in our telephone business, but in industry in general.

Doesn't the following sentence sound familiar?

> In line with the objective to encourage all supervisory personnel to participate, conferences were planned for discussion of the program prior to starting its installation.

We are all used to that kind of phraseology. It is familiar, traditional, and perhaps somewhat comforting. But if you wanted to tell somebody the same message you would say:

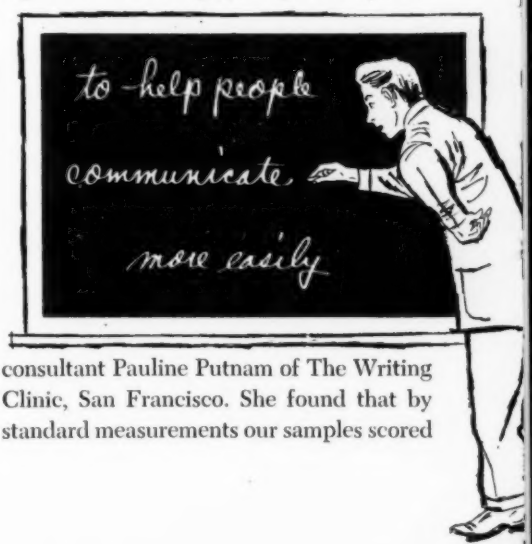
> We wanted to get supervisors to take part. So we planned conferences where we could discuss the program before we began it.

A young craftsman gets promoted to a desk job and finds he has to dictate letters and memos for the boss to sign. What does he do? Naturally, he goes to the files and sees how someone else wrote them. If that writing was full of jargon, businessese, if it was windy and redundant, well, that's the way he copies it. Just as countless others before him have done.

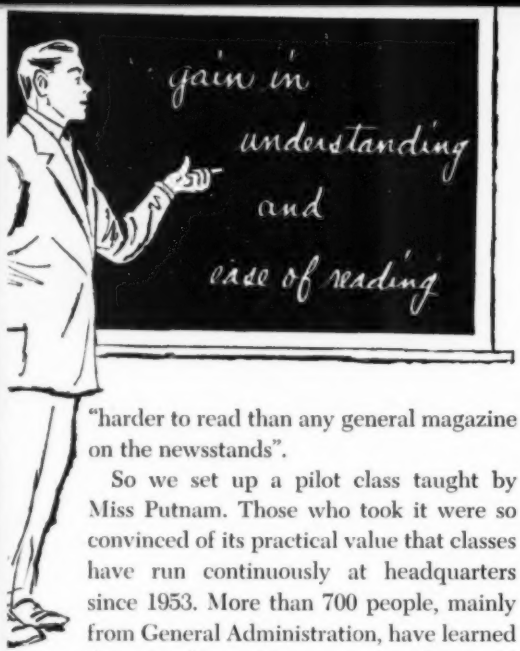
So your biggest problem is to encourage people to let go of their old habits of writing. This is made harder because many people think business writing should sound formal and impressive. But nothing is further from the truth. It is, after all, *business* writing. It is one experienced man talking to another–on paper–about the details of a progressive, modern operation. Why on earth should it have to sound academic and out of touch with life?

But such habits aren't broken easily. Believe me, it takes skillful re-education to put across a few such simple ideas. And then it takes practice and practice – and more practice – to make them stick.

SHORTLY after our booklet "Mark to Arthur to You" began circulating, Pacific Company took another step toward improving our written communication. We had our writing ailments thoroughly diagnosed by able



consultant Pauline Putnam of The Writing Clinic, San Francisco. She found that by standard measurements our samples scored



"harder to read than any general magazine on the newsstands".

So we set up a pilot class taught by Miss Putnam. Those who took it were so convinced of its practical value that classes have run continuously at headquarters since 1953. More than 700 people, mainly from General Administration, have learned that simpler writing is an excellent and easy-to-use business tool.

Miss Putnam's classes are true workshops. Each has about fifteen members, who meet for three hours once a week for six weeks. Before the course, our people turn in samples of their writing, which form the basis for the practice done in class. Homework is assigned each week. And at the end of the course each student has a private discussion of his own writing problems and progress with the teacher.

We cannot say that teaching a few hundred or a few thousand people in a company to write more directly and simply will soon revolutionize telephone writing. There is a mountain of habits to be whittled away. Such a job can't be done overnight. But in our Company at least, we can definitely see the progress.

Right from the first, results showed up from Miss Putnam's classes. A typical Plant instruction on how to fill out forms, for example, originally had 465 words. Now – after students rewrote it – it says the same thing in less than 200. Without being curt or "telegraphic," but simply by using the principles of clear expression, you can trim almost any piece of telephone writing by one-third. You gain in understanding and ease of reading, and sacrifice none of the meaning. When you consider the volume of words streaming through our business, one-third is an impressive saving.

Over the past three years, a number of other practices have been rewritten or new ones issued. The people whose job it is to write them are turning out material that is concise, fast to read, and easy to follow. When you ask them what they think of our business writing class, you get an enthusiastic answer. They find their work quicker and easier to do. It's more fun. And people have much less trouble understanding what they write.

As OUR PROGRAM got under way, we of course were interested in how much time simpler writing could save. We kept our eyes open for ways to evaluate the course in terms of dollars and cents. Such things aren't always easy to measure. But the Plant Department gave us a clue when they estimated that five minutes' reading time a day for 6,000 craftsmen could mean a saving of $300,000 a year to the company.

As the new style of writing filtered out into the field, employees noticed the change. They began asking questions. It is only fair to say that a number were critical at first. Occasionally some literal-minded student went overboard. The person on the receiving end – with some justification – called it too simple or grade-schoolish.

But on the whole the response was favorable. People did find such writing easier to read and understand. They wanted to know more about the headquarters training program. How could they get in on it?

Pauline Putnam was doing a fine job for us, but obviously one professional outside teacher couldn't fill our growing need. How could we extend the benefits to people in all departments throughout the Company?

There seemed to be only one logical step—integrate the training into the framework of the business. This meant equipping people to be writing "teachers," and setting up departmental training programs. We found that some people who had had the course were already starting to do this on their own. True, they couldn't replace a professional teacher with a writing background, like Miss Putnam. But many had much training experience from other phases of their telephone careers. And they certainly knew the business and its requirements.

We worked out a course of training. Then we presented this to the operating departments in all our Areas. We told them that if they were interested and would pick trainees, we'd be glad to teach them and give all the follow-up help they wanted.

So, in June, 1955, we began working with departmental people who were chosen as likely "teachers." We spent a full week with each group, using a manual we had put together as a guide. We also gave them a copy of Robert Gunning's "Technique of Clear Writing" and suggested other books on the subject. During the week, they learned the few simple principles and had ample opportunity to practice. For — as Pauline Putnam first pointed out and all our experience confirms — you can't change writing habits by reading or hearing a lecture. You must have *practice* — the more the better — if the principles are to stick with you.

Since then, most of these "teachers" have conducted classes with a good deal of success. Several have devoted full time to it, others did it along with their regular jobs. They have now trained about a thousand telephone people, in the small classes we believe are best for this type of teaching.

TRUE, there is some dilution in this process. The people don't get the benefit of a really experienced teacher. But they learn the principles, and they don't have much trouble seeing the value of better writing. Most of them now have a much different attitude toward how they express themselves in words. And their results show this.

We are not too disturbed by the limitations of this process. The people chosen to teach are good leaders. The manual they use is almost self-teaching. They guide their classes through the practice material, working to give a point of view and enough actual writing to break the old habits. Often, the teachers as well as the students keep on learning. The important thing is, they come out able to recognize wordy, hard-to-read writing whenever

they see it. And they have an urge to do something about it.

Once we had helped our departmental people to get this broad general program under way, we turned to specific areas where we might be of help.

What about the millions of letters we were sending to customers? On the whole they were accurate, they were courteous, and they were complete. But how well did they measure up to our better business writing principles? How well did they measure up to the human objectives of being warm, sincere, and friendly?

All too often, our letters were stiff and formal. When the subject was an involved one, the writer often tangled himself – and the customer – in a really impressive maze of confused verbiage. We could understand the problems our field people had in these letters. But could we do anything to help them?

We talked it over with our Commercial people, and decided to try it on a strictly experimental basis. We got together with some small groups of service representatives. We covered our basic principles of simple, clear, direct writing. We stressed the friendly, conversational tone. "Write as you talk," we said. We showed our girls how easy and natural this approach could be – more fun and less work. The response from our Commercial girls was enthusiastic, and we hope to develop this special training further.

By this time, of course, people knew what we were doing. We'd get calls. From a plant staff man. From a tax expert. From somebody in Accounting. "Look," they'd say, "we've got a draft of a letter here. It's kind of an involved letter. What we have is much too long and complicated. But it has all the facts. Can you shorten it and put it into simple English for us?"

Could we! These were customers. Every such request was taken care of in a hurry and – as far as we know – to the satisfaction of the people who came to us.

We also got requests for direct help in rewriting various departmental practices. This we were only too happy to give. For, quite obviously and naturally, when you work with something like this, and see the benefits it can have for so many people and for our business, you get zealous. You get steamed up. And I suppose you bore a lot of people with your enthusiasm. But you never stop working at it, nor miss an opportunity to push it a little farther along the road to acceptance.

There are problems. Dilution of the teaching we have already mentioned. But we don't regard that as too serious.

Follow-up is one we're not sure we have solved. People are enthusiastic at first. But when they get back to work the boss doesn't always see eye-to-eye with this new approach. He's had certain habits for 25 years and they don't change easily. And to some extent we're all in the same boat. One week of training isn't going to wipe out habits that took years to build up.

One final word: All this may seem a pretty new approach. But people have been talking about simpler writing for many years. We're just trying to put it into practice. Our efforts – we keep reminding ourselves – are not designed to create "writers," not intended to displace fine writing or the proper use of words. We are only trying to help people communicate more easily and better with the written material our business has so much of. We think we have helped them, and we hope to do more.

A rethinking of our requirements for documents and data will develop paperwork operations which contribute to the effective conduct of this business

BETTER PAPERWORK VIA WORK SIMPLIFICATION

RAYMOND H. FROST

Clerical Operations Planning Engineer, DEPARTMENT OF OPERATION AND ENGINEERING, A. T. & T. CO.

THE GROWING VOLUME and complexity of the Bell System's paperwork is important to all of us. We are concerned not only with accuracy and economy but also because of the large amounts of time and clerical effort required to get things done. Our paperwork jobs have grown to such size that we must find some relief—and find it fast. We need a full-scale program which will do for the modernization of clerical routines and similar time-consuming procedures what the mechanization of central offices did for the handling of telephone calls.

The Bell System's paperwork has grown in proportion to its physical growth. The expansion that has taken place is witnessed by the rapid growth in numbers of telephones, central offices, outside plant facilities, and the like. The factors of growth in paperwork, while just as active, have not, unfortunately, been as apparent.

Our physical growth has created increased paperwork and related functions literally by the billions. Expanded facilities result in expanded volumes of toll tickets, service orders, time sheets, reports. Also, many other means of keeping track of our business on paper have grown up in all departments. Realistically, we know that it hasn't been possible to accomplish the almost incredible physical growth without incurring multiplied problems. One clear sign of our paperwork expansion has been the rapid growth in the size of the clerical force required to handle it. In the past eleven years this force has increased almost 130 per cent. In this situation we find ourselves sharing the discomforts of unprecedented paperwork along with government and business in general. Like them, we are finding the need for relief a pressing one, requiring the prompt creation of a program designed to streamline the paper processes with which we operate our business.

Much of this program will be dependent on the use of new techniques. In large part, these include the expanded use of modern office machines in many more phases of

Are your files showing?

our paperwork job than exist today. It will include the resourceful use of conventional equipment now available and, in the future, new electronic machines that are just beginning to indicate their potentialities in the field of data processing. We must carefully plan for practical ways by which machines can do work now done by our clerical forces—forces that even today are increasingly difficult to employ. In subsequent years, if these forces keep on growing at the same rate as in the recent past, such employees may not be available in sufficient numbers for our needs. All evidence points to an approaching impasse. This situation has caused business to find all possible means of using machines to handle its paperwork economically.

Such machines are now, and undoubtedly will be, of great help. In spite of this, they are not simple panaceas. They are also expensive. They do not afford free passage from present systems to easier and faster methods by merely depressing one of the buttons in which they abound. Mechanization of the clerical job does not burst into the full blossom of usefulness from the mere dropping of a seed. Rather, it is somewhat of a hothouse variety, and can be made to flourish only through a great deal of careful thought, planning, and testing. Also, for best results, these machine systems must not be patched onto our present procedures. Machine procedures should be devised as clean-cut and fresh approaches to doing the paperwork job, uncluttered with residual deposits of an old method upon which we have hung a rapid-cycle motor.

If we cut away the popular press fanfare accorded office mechanization, a few homely truths remain. Of these, two should be closely scrutinized:

In the first place, sound management indicates the desirability of mechanizing many types of clerical operations, now and in the future.

Secondly, it will take a large investment of man-years to plan how best to make use of the capabilities of machines to do our clerical work. Simplifying and integrating procedures, and understanding and testing and determining the economies of machines, will occupy those years fully. At present our talent and our machine capabilities are not up to future requirements.

Using machine techniques as an approach to improved paperwork procedures must, of necessity, be done with every regard for high standards of quality and efficiency. Such standards might well be patterned after those that have marked the Systems' successful pursuit of technological advance. We must insure meeting the requirements exacted by a basically

simple, carefully integrated, economical system of paperwork.

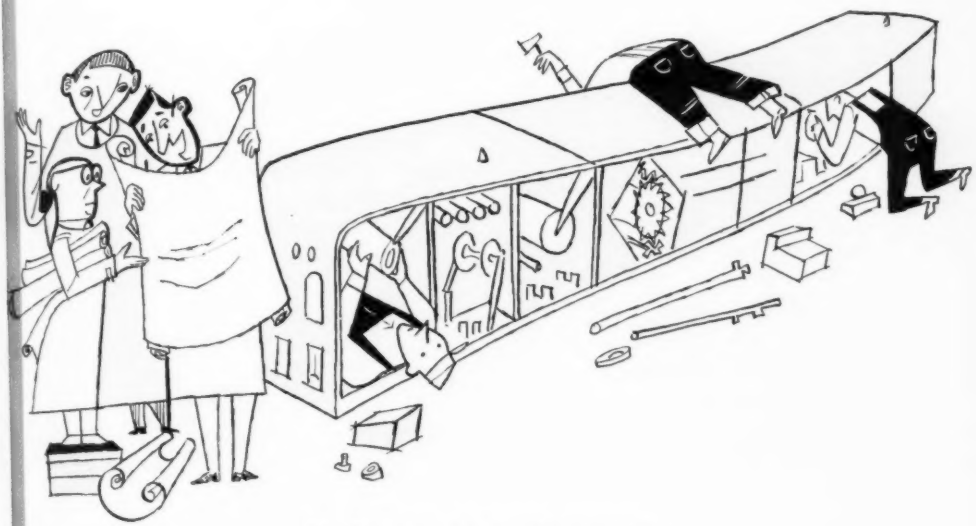
OUR INITIAL PHASE in creating such a system does not involve machines at all. Nor does it mean working harder. It does mean working *smarter*. We are finding that we can work smarter through the use of a new twist in the techniques of time and motion study. Many years ago these studies were developed as a means of improving operations which were primarily made up of motion. Symbols were devised which permitted recording of the individual movements in an operation. As a result of examining charts made up of time and motion symbols, it was possible vastly to improve many operations where the saving of motions could be translated into a real saving of dollars and cents. Much of the pioneering work in this field was done by Messrs. Taylor and Gilbreth, who early became specialists in the economy of motion.

We have used these same principles in charting the movement or flow of paper. The symbols used by Gilbreth* to illutrate motion are modified to display the flow or movement of paper through an organization. This simple technique is the basis on which a better paperwork job is fashioned. We call such an approach "Work Simplification". Through its use we can find out and record:

— What everybody in an organization does with a piece of paper
— How many times it changes hands
— Whether it is being used as intended
— Is the information duplicated somewhere else?
— Is it actually needed at all to do the job?

These data and many other factors are determined through interviews and questioning of people who actually process and use the paper we are studying. To analyze this movement, a "flow chart" is prepared

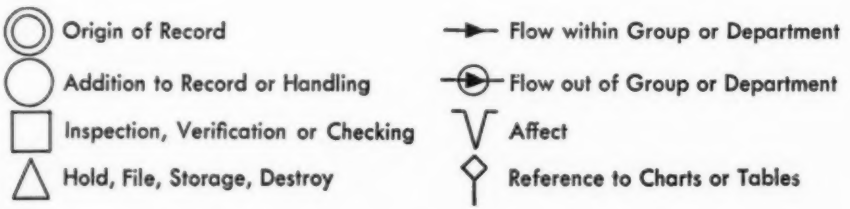
*Mr. Gilbreth's interest in time and motion principles was popularized some years ago in a book and motion picture "Cheaper by the Dozen".



Machines are not simple panaceas.

which lays out in schematic form everything that happens to a particular piece of paper. Generally the symbols used in these flow charts are modified "Therbligs"—Gilbreth spelled almost backwards. Therbligs may be compared to a radio diagram, with its standard symbols for tubes, capacitors, resistors, and other parts connected in an organized manner so as to show the operations on a radio signal from antenna to speaker. Many pages would be needed to do this same job in text form. We can show operations of handling paper in a like manner. When completed, a paperwork flow chart offers a clear, concise picture of what is taking place. This allows for an objective and critical analysis of the entire flow of paper in a given operation. It also permits quicker recognition of what improvements may be made.

Here are the recognized symbols as used today in the Bell System to chart the flow of paperwork.


Origin of Record
Addition to Record or Handling
Inspection, Verification or Checking
Hold, File, Storage, Destroy
Flow within Group or Department
Flow out of Group or Department
Affect
Reference to Charts or Tables

Using these symbols in a simple illustration, we can see how the origin of a Payroll Change Report, involving a change in title, might be portrayed on a flow chart. By making reference to the symbols below, we can easily interpret what happens in this instance. The Report is originated at the left of the chart. This is indicated by the doughnut symbol on the lower line. Everything else that will happen to this form is recorded on the same line. Other records which may affect it are shown on other lines. In this case, for example, the personnel record from which much of the data will be recorded on the Payroll Change Report is shown on one of the lines below. Here we merely show the record coming out of file, being posted, being used to prepare the Payroll Change Report, and being returned to file. Using the *addition to record or handling* symbol we next show information being entered on the Payroll Change Report. Following this, the typing is verified, approval is obtained, and finally it is sent along to the division office. All this is portrayed in fewer words than it takes to interpret it for you in this paragraph. Do not be taken in by the simplicity of the subject for this

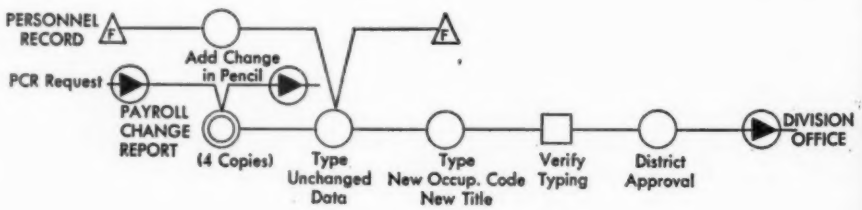


chart. Many complex operations have been readily reduced to this same type of chart and improvement made as a result of the clarity with which they could be studied.

By recording the movement of paper as described by the people who actually move it, the completed flow chart gives an accurate picture of the present procedure. In addition, it permits:

- Display of facts in greater detail than text allows
- Appreciation of the over-all movement of paper
- Display of needless operations
- Understanding of relationship of one job to another
- Appraisal of usefulness and adequacy of source data
- Inclusion of most feeder lines and branchings in paper flow

Flow charts covering a wide range of operations throughout the System have considerably improved our detailed understanding of many procedures. This type of data is invaluable when considering the use of machines for such paperwork operations.

At this point in our Work Simplification technique it is possible to make an analysis of the operations with a view toward the basic goals of –

1. Reducing all possible needs for the paper itself.
2. Eliminating where need for the end product no longer exists.
3. Eliminating duplications.
4. Reducing over-developed activities.
5. Simplifying manual procedures.
6. Applying new equipment where advantageous.

Through the use of work simplification tools, many of the inherent problems in paperwork are brought to light and these objectives realized.

The most effective users of Work Simplification techniques are they who have learned to add human relations to the technical approach. While assembling facts from many sources through conferences and interviews, they give the people with whom they deal a strong feeling of having contributed to a better job. This improves attitudes, reduces complacency, gains cooperation, and minimizes objections to change. It encourages everyone who does paperwork to help to improve it.

An effective work simplification program starts with selling ideas to people throughout the organization. It means enlisting both clerks and supervisors in participation in and support of the effort. People who do the work will participate more freely in its appraisal and change, if through interview and conference their feelings of insecurity and fear of criticism are reduced. Human relation factors are a major part of Work Simplification. They lead to common sense solutions of paperwork problems.

With the above philosophy and tools, the Bell System has set out to modernize its paperwork. In the process, a conviction has grown that in the successful conduct of the business, procedures are assuming almost equal importance with telephone technology itself. Evidence of this realization is found in the creation at A. T. & T. headquarters in 1953 of an interdepartmental clerical operations committee. This organization is composed of a steering committee, which plans and initiates programs, and a working committee, which carries out such programs. Since that time, the means of improving the Bell System's paperwork has been undergoing a new scrutiny. This has been made possible by the creation of similar groups in most of

Facing the executive decision.

the Associated Companies devoted to the detailed examination of clerical and paperwork operations. With coördination through the headquarters committee, such groups operate as individual laboratories in this field.

This type of research effort was initially carried out by designating twelve broad fields of clerical operations, as outlined by the headquarters committee. In the relatively short time that this activity has been under way, the original twelve broad fields have expanded to more than two hunded specific areas of study and development. Included are paperwork functions in every department of the business. As the exploration phase of work is completed in one company, results are compiled and published. Through the headquarters committee these data are forwarded to all Bell System companies for their information and use. Thus, the results of the laboratory effort in one company becomes the useful tool of all.

Clerical operations committees, or their counterparts, the business procedures organizations and procedures development teams, are interdepartmental in composition, representing all the major departments of the business. They can act jointly on most projects. In doing so the company objective is emphasized. Their work supplements but does not duplicate that of departmental methods staffs. Selected fields of committee activity are usually too broad to be handled satisfactorily by the methods group in any one department. Since this type of organization is not as-

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signed day-to-day operating tasks, distractions are minimized. Concentrated effort may be applied to the detailed study of the selected procedures. Of course, close coördination is carried out with all who have a direct interest in the operations being analyzed. The team approach provides an ideal opportunity for a basic rethinking of paperwork operations.

This team provides one means for continually reviewing the need for records, forms, reports and all other paper tools of our business. Such review is no less solicitous than that accorded the adequacy of carrier systems, switching systems, or other mechanical devices on which our subscribers depend. The paperwork devices on which we depend internally for appraisal of how our business is operating need to be crisp, efficient, and readily available. Clerical Operations teams are helping to provide this sort of administrative tool to meet today's operating requirements.

TODAY, the current adequacy of our paperwork is of direct interest to more people than ever before. This is largely due to the nearly one thousand Bell System management people who have been exposed to some type of Work Simplification training.

Many reports—few decisions.

Another two hundred are working full time on the problems of paperwork procedures. Much has been accomplished in improving these operations, but a great deal remains to be done. We shall need to learn many more ways of getting along with fewer documents and reports. We shall continually need to re-examine ways that the paperwork of several departments can be combined for efficiency and improved data. Training and appreciation courses in the philosophy and techniques of Work Simplification are continuing.

The current program of Work Simplification is a response to pressing needs. Needs for:

- More effective use of manpower
- More output for effort expended
- Obtaining better data faster
- Streamlining and simplifying to improve understanding
- Eliminating unproductive work

These are the principal targets at which Work Simplification people are aiming.

These needs can be met. Indeed, they must be met if the demands of today are to be contained and the promise of the future fully exploited. Office progress must keep pace with technological advances. The talents of technical people must not be reduced by the burden of paperwork procedures which confuse and impede. There is a greater need today than ever before for utilizing this kind of talent to the best possible advantage. Using these people to process paperwork does not answer this requirement.

The principles, philosophy, and techniques of Work Simplification must find ever widening circles of disciples throughout the Bell System. Fewer problems will be created as this becomes a way of business life with more and more people at all levels. As we alleviate present paperwork problems and gain knowledge about how best to develop new procedures, clerical and paperwork operations will be a helpful partner in the effective operation of the business. Only then will we be better prepared to capitalize on the promise of mechanization. The full benefits of modern machine processing lie in the rethinking of requirements and the energetic pursuit of Work Simplification.

New and more convenient services are becoming available as constant creative effort brings about both improvements and replacements

MODERN EQUIPMENT FOR HOME AND BUSINESS

EDWARD L. SHERMAN

New and Special Services Engineer, DEPARTMENT OF OPERATION AND ENGINEERING, A. T. & T. CO.

THIS IS a report on some of the new equipment the Bell System companies have made available to their customers in recent years. It deals with items of general rather than specialized interest – things which customers see and use every day in their homes and stores and offices – rather than complex and highly specialized systems and services such as some of the new or improved private line teletypewriter systems; service arrangements for some of the U. S. government departments, the airlines and right-of-way companies; municipal emergency reporting systems; new central office switching systems; and other major developments.

The very existence of these new equipments, and their presence in ever-increasing numbers in homes and stores and offices, is the result of a deliberate creative effort on the part of Bell System salesmen, engineers, designers, and development and production workers to keep abreast – and even ahead – of the evolution of present-day habits and standards of living and working. It is a bringing-to-life of the Bell System as a dynamic marketing business, and of its concept of telephone service that is attractive, convenient, and easy-to-use.

Who hasn't had occasion to make a telephone call that involved dialing in a dimly lighted room? Having to dial in the dark is a thing of the past for some 60,000 families who, in the last two and one-half years, have had the illuminated dial telephone installed. On this set, which of course comes in color, a neatly hooded lamp near the figure 4 on the dial lights up when the hand set is lifted. It provides ample light for dialing and for taking notes, and when the hand set is replaced the light goes out.

A newer and more versatile version, just becoming available, has a small button on the left front corner of the base of the instrument. Turn the button one way and the light glows at half brilliance as a night light until the hand set is lifted, then shifts to full brilliance. Turn the button the other way and the light simply goes on as the hand set is lifted, off as it is replaced.

Convenience Here and There

FOR many years people with impaired hearing have been able to obtain special amplifying telephones. These have now been transistorized, which has improved performance and maintenance and removed the need for commercial power connections or local batteries, because the transistors are happy to work on the trickle of power they get from the telephone itself. They have also been restyled into the general design of the 500-type telephone. Some 80,000 of these "volume control" sets have gone into use since they became available about two years ago.

In the same general family of transistorized telephones, two new models are just becoming available. One, intended for use in exceptionally noisy locations, has a push-to-listen switch in the hand set (to minimize the entry of room noise) as well as a volume control button. Its twin is a telephone which amplifies outgoing rather than incoming speech. Even a whisper which is inaudible to a bystander will be transmitted so as to be heard well and clearly at the distant end of the conversation. As it makes no difference to the amplifier whether the whisper is deliberate and contemplated, this telephone will be attractive to customers who require privacy and also to those with weak voices. (So that those who waive privacy or have big, robust voices will not blast the other fellow's ear if they happen to use one of these sets, there is a transmitter volume control button in them.)

The modern era of hands-free telephoning began in the latter part of 1954 with the introduction of the speakerphone, a set that may be used either as a regular hand telephone or hands-free. In the latter case a sensitive microphone (to pick up the user's voice for transmission) and a loudspeaker (through which the incoming speech is heard) come into use. In some models of the speakerphone the microphone and the loudspeaker are in separate housings; in others the microphone is included in the regular telephone instrument and only the loudspeaker is a separate piece. Both models are available in color.

The speakerphone is designed to give the user good hands-free communication while within normal range of the set—generally about three feet. Just as in face-to-face talking, noise in the room or poor acoustics may make it harder to converse; when difficulty of this sort is encountered the regular hand set can of course be used. As a hands-free set the speakerphone is

No more dialing in the dark.

Hands-free telephoning with the speakerphone.

extremely convenient during long conversations or when the user wants to refer to records or make notes or just plain light up a smoke and relax. And it is wonderful when families want to visit by telephone or where there is a need for small group conversations. It is not, however, designed for use with large groups of people or where the user is far away from the microphone.

There are about 75,000 speakerphones in use. Some of the uses to which they are being put are more than merely interesting – they are positively heartwarming. One was specially installed to enable an "iron lung" patient to turn the set on and off by a slight movement of his head–the only part of his body he could move. By arranging the line for manual rather than dial operation, he could also place calls. A semi-invalid in a southern town must generally stay in bed or in an easy chair in the same room. A speakerphone at the chair gives easy access to the outside world, and by means of keys located at the bed it can be turned on or off at will to make or receive calls while in bed. In California another speakerphone gives the same comfort to a bedridden patient in a sanitarium. An antique dealer with a disability which

The man from the golf course—and his automatic answering set.

made it a hardship to hold a hand set found that a speakerphone readily overcame the difficulty.

A mother doesn't have to choose any more between interrupting her baby's bath or missing an important call. The drug store prescription clerk doesn't have to leave a prescription half-finished, and risk forgetting something, while he answers the telephone or places a call to reorder an ingredient he found running low. Grandma can go right on with her sewing while she orders groceries, arranges a luncheon or hairdresser's appointment, or just visits with a neighbor. Small wonder, then, that speakerphones are proving so popular.

Convenience and Efficiency in Business

PERHAPS you remember seeing last summer in one of the national magazines a picture of a man in sports clothes and on a golf course lining up a putt, with the caption "His telephone's ringing—and *he's* answering it." That was a Western Electric Company advertisement for the automatic answering and recording set.

This equipment answers the telephone, plays out to the calling party an explanatory recorded announcement, records a short (about 30 seconds) message if the calling party wishes to leave one (it will take at least twenty of these), and after the hang-up restores to its former condition of attentive waiting for a call. Another model merely answers calls and gives the recorded message left for calling parties. A third model provides up to a full hour of recording time, which may be broken up into as many as 240 fifteen-second in-

coming messages or into longer and proportionately fewer ones.

Nearly 40,000 of the sets which both answer and record have been installed, and about 5,000 of those which answer only. Although most of them are in businesses, some are in residences for social rather than business use. It is estimated that they answer over 40,000,000 calls per year.

As might be expected, automatic answering and recording is being used in a number of interesting ways.

Down in Maryland the telephone company business office in one small community uses it during lunch periods and after hours. Here are some of the messages left by customers:

"I am calling to report the light is out in this booth."

"A tree has fallen over your line on my property."

"I promised to come in and pay my bill today. I won't be able to make it until tomorrow. If this is not all right, please call me before 3 P.M."

Pharmacists in a certain hospital were constantly being interrupted by telephone calls from ward nurses ordering drugs and prescriptions. An answering and recording set was installed and now the orders recorded are transcribed at intervals and filled with a minimum of interruptions.

A gas company in Ohio uses the answering only set to answer calls when all posi-

A desk-top cordless private branch exchange switchboard.

tions of its service department order turrets are busy, and ask customers to wait a moment until a representative is available to pick up the line. Sometimes the recorded announcement is used to give information customers may be calling for—for example, during a severe storm when power failure caused gas furnaces to shut off, the message told home owners what to do.

Out on the Pacific coast a Chinese-American who is frequently away from his business uses automatic answering and recording to take messages from his customers and suppliers who speak Chinese or hard-to-understand English.

A couple in one of the eastern states get a plus value from the answering and recording set they had installed in their home to take care of social calls. When they go away, they are apt to make it do duty as a scarecrow, or scare-prowler, by leaving an announcement message saying that Mr. and Mrs. are not at home but that the maid will return at any moment.

To the calling party and generally to the called party as well, an unanswered call is an incomplete and unsatisfactory service. Telephone answering service, a business conducted by independent businessmen, is a recognized and valuable aid to call completion—and to satisfactory service for both calling and called party. The telephone answering services, who are valued customers of the telephone companies, give a highly personalized, flexible, and versatile service that many telephone company customers, especially professional men and women, find essential. There are an estimated 1,500 telephone answering services and they answer about 200,000 telephone lines.

Two special switchboards, called the 557A and 557B secretarial boards, designed especially to meet the requirements of the telephone answering services, have become available in the last two years. Both boards provide for the termination of the lines of clients of the answering services and also P.B.X. station lines used in administering other phases of the answering service. As compared to the 557A board, the 557B board is designed to be used primarily for answering clients' lines and only incidentally for administrative purposes. Other special features of these boards include extra-wide designation strips (to facilitate entry of clients' names and preferred answering phrases), a wider shelf (to provide more writing space), arrangements to permit positions to be grouped or split as peak loads come and go, and a privacy feature that prevents attendants from connecting to clients' lines except when the client does not himself answer the telephone. There are about 350 of these boards in service and others are going in right along.

SOME OF THE CHANGES which have taken place in recent years in key equipments and the smaller P.B.X. switchboards are good examples of "newness" brought about by modernization, restyling, or redesign of something already in existence.

Early in 1952, two new cordless switchboards became available as a result of updating and face-lifting the 3-trunk and 7-station and the 5-trunk and 12-station boards. The new P.B.X.'s are small, low, compact all-metal consoles with sloping key panels. Red and white lamp signals have replaced the former magnetic signals and drops. Rounded corners and a neutral beige-gray color in a fine wrinkle texture (to minimize glare) give them an appearance which harmonizes well with modern office furniture and equipment. They have been popular: about 7,000 of the smaller and 22,000 of the larger are in use.

Much the same thing has been done with the key boxes associated with 101-type key equipment. These are just becoming available and it is expected that they, too, will be liked by customers.

IN THE FIELD of button-control telephone systems, a dial selective intercommunicating arrangement made its appearance in 1953. This permits up to nine telephones, associated on a common intercommunicating line, to signal each other one at a time by operating the button which controls the common line and dialing a 1-digit code on the regular station dial. The button-control telephone may have buttons which light to show other telephones that the intercommunicating line is in use; and if desired, the system may be arranged so that all but the calling and called telephones are excluded from the intercommunicating line while it is in use. Of course, by operating other buttons, any of the telephones may be connected to central office lines for the purpose of making outside calls. Over 50,000 of these convenient and efficient systems have been installed. A new system of larger capacity (up to 36 telephones, with the ability to handle two conversations at one time) has been developed and is in field-trial status.

This highspot account of some of the more common new items that have come on the Bell System scene in the last few years has been almost necessarily little more than a list or catalog, and has not included even a mention (until now) of such extremely interesting new developments as the very popular Airlite aluminum outdoor telephone booth; the brand-new 756A dial P.B.X. system, which is now in field trial; or inward dialing to P.B.X. telephones, recently introduced on a trial basis at the P.B.X.'s serving several telephone company headquarters' offices. It will, however, indicate in a broad way, at least, what has been done recently to bring into the marketplace new and improved equipment to meet customers' new or continuing needs.

Meeting New Needs

AS SOON AS a plant or an animal comes into being, it starts to change and die. So, too, items of telephone equipment start to become obsolescent as soon as they become available. In the Bell System this is a well-known, recognized, accepted fact of life. What is suited to today's concepts – customers' as well as our own—is continually becoming outmoded by something newer that will provide the same or better service. There is a creative discontent at work which is expressed in a constant, unremitting search for improvements in or replacements for items which for their more or less brief day were "new equipment."

How is this search conducted? How did the things we have been talking about here happen to come on the scene? How do we go about anticipating change and expansion in customer interests and requirements? That, as they say, is a story for another day.

Nearly 250 operating telephone administrations coöperate in furnishing statistics for the unique A. T. & T. compilation of facts about the industry

WHERE THE WORLD'S TELEPHONES ARE

ELIZABETH WRENSHALL

Chief Statistician's Division, COMPTROLLER'S DEPARTMENT, A. T. & T. CO.

IN LESS THAN eighty years the world acquired the nice round number of one hundred million telephones. There were 2,600 at the beginning of 1877, all in the United States. There were 101,000,000 at the beginning of 1956, more than half of them in this country.

Each year the Chief Statistician's Division of the American Telephone and Telegraph Company publishes a booklet on world telephones. Formerly entitled "Telephone Statistics of the World," the name has been simplified to "The World's Telephones." About 25,000 copies of the latest edition have been distributed. You may obtain a copy, if you wish, from the A. T. & T. Company's Public Relations Department.

The current report contains data as of January 1, 1956. A time-lag of approximately a year between the date of the statistics and the date of publication sometimes leads to confusion, such as: "The January 1, 1956, issue was sent to us by mistake. May we have the 1957 issue?" Alas, no; you have the latest edition. Some 250 operating telephone administrations are queried for statistics each year. The great majority of them are extremely cooperative and prompt in replying. Some, with fiscal years ending in March or June, compile their data late in the year. A few just do not answer.

Why does our company consider it worth while to gather and publish telephone statistics on a world basis?

The information has many uses.

Virtually all large industries conduct surveys to determine the extent of use, both domestic and foreign, of their products or services. The American Iron and Steel Institute publishes figures on steel production by countries. Hydro-electric Power Commissions gather international data on electric energy. A glance at the table of contents of the "Statistical Yearbook" published by the United Nations shows an imposing list of tables by countries relating to many fields of interest–agriculture, construction, transportation, social statistics – having the over-all purpose of growth comparison. Similarly A. T.

& T. assembles world telephone statistics.

"The World's Telephones," the only report that attempts to account for total world telephone distribution, is used by communications people in making studies of comparative development. Distribution of the booklet is made to all the contributing administrations. Many of these use the data in their Annual Reports or other official publications. Translations have been made into many languages.

In earlier years, distribution of the report was limited largely to telecommunications enterprises. Gradually, however, names of organizations interested in other spheres of activity have been added to the mailing list. Commercial firms studying the market potential of foreign cities for the sale of their products find "The World's Telephones" useful, since a concentration of telephones within a given area is an indication of a certain standard of living. Thus, many exporting firms have asked to have the report sent to them regularly. Banks and other institutions which conduct international surveys sometimes use telephone development as one of their economic indicators.

Libraries, both here and abroad, maintain files of the report. Grade schools use it in mathematics and geography classes to illustrate practical application of those subjects.

The afore-mentioned disparate institutions, plus hundreds of individual subscribers, make up the mailing list.

Some Facts and Figures

THERE WERE more than two telephones at the beginning of 1956 for every one in existence only ten years earlier. There was an average of 3.7 telephones for every 100 persons in the world, as compared with 2.8 for 1950, 1.9 for 1940, and 1.7 for 1930.

Most of the world's telephones—nearly 89 per cent—were located in the two continents of North America and Europe. The huge continent of Asia had fewer than 4½ million telephones (New York City alone had nearly four million!), and seventy per cent of those were concentrated in one country: Japan.

COUNTRIES REPORTING ONE MILLION OR MORE TELEPHONES
JANUARY 1, 1956

	TELEPHONES			CONVERSATIONS YEAR 1955		POPULATION
	Total	Per 100 Population	Per Cent Automatic	Total (000's)	Per Capita	Per Square mile
United States	56,243,206	33.7	83.6	67,650,000	409	56
United Kingdom (1) (2)	6,879,511	13.5	77.3	4,235,900	83	541
Canada	4,149,300	26.3	74	6,956,300	446	4
German Federal Republic	3,985,212	7.6	94.1	3,141,900	60	553
Japan (1)	3,123,449	3.5	53.6	11,137,500	125	631
France	3,116,697	7.2	68.2	2,347,900	54	204
Italy	2,329,139	4.8	95	4,036,000	84	414
Sweden	2,219,075	30.4	76.5	2,967,200	407	43
Australia	1,653,149	17.8	70	1,240,700	135	3
Switzerland	1,214,640	24.3	98.9	902,300	181	314
Argentina	1,127,933	5.9	82.4	3,377,500	177	18
Netherlands	1,117,186	10.3	95.4	1,016,000	95	865
Spain	1,092,857	3.8	79.6	2,358,700	81	150
German Democratic Republic	1,042,541	5.7	91.5	885,600	49	443

(1) March 31, 1956.

(2) Includes data for the Isle of Man.

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Half of Africa's 1.4 million telephones were in the Union of South Africa, and most of the others were in small areas along the north coast.

South and Middle America together had only about three per cent of the world total. Latin America's three largest systems were those of Argentina (which had more than a million telephones), Brazil, and Mexico. Plans are under way for sizable expansion of systems in some of the smaller countries.

Although Oceania had fewer than 2½ million telephones, the proportion in relation to population was high: sixteen per 100 persons. Three areas in Oceania, namely Hawaii, New Zealand, and Australia, were among the telephonically highest developed in the world.

Countries Reporting More Than One Million Telephones

FOURTEEN COUNTRIES, which in the aggregate accounted for nearly 90 per cent of total world telephones, reported more than one million telephones each as of January 1, 1956. Ten years previously, only five countries reported a million or more. The U.S.S.R. is not counted in this grouping, inasmuch as that country has not replied to our queries since 1936, at which time the million mark had not been

TELEPHONES — CONTINENTAL AREAS (1)

AREA	TOTAL			PRIVATELY OPERATED		AUTOMATIC		CONNECTING WITH BELL SYSTEM	
	Number	Per Cent of Total World	Per 100 Population	Number	Per Cent of Total Tels.	Number	Per Cent of Total Tels.	Number	Per Cent of Total Tels.
North America	60,420,500	59.8	33.1	59,791,900	99.0	50,107,200	82.9	60,408,500	100.0
Middle America	733,100	0.7	1.3	655,600	89.4	558,800	76.2	721,000	98.3
South America	2,568,200	2.6	2.1	1,212,800	47.2	2,116,900	82.4	2,450,700	95.4
Europe	29,090,100	28.8	5.2	4,781,300	16.4	22,355,700	76.8	26,889,000	92.4
Africa	1,411,200	1.4	0.6	28,700	2.0	986,000	69.9	1,229,200	87.1
Asia	4,411,200	4.4	0.3	3,158,900	71.6	2,489,400	56.4	3,146,400	71.3
Oceania	2,365,700	2.3	16.0	165,600	7.0	1,656,300	70.0	2,355,200	99.6
World	101,000,000	100.0	3.7	69,794,800	69.1	80,270,300	79.5	97,200,000	96.2
United States	*56,243,206*	*55.7*	*33.7*	*56,243,206*	*100.0*	*47,015,867*	*83.6*	*56,239,777*	*100.0*

(1) Includes January 1956 estimates for countries which had not reported figures as of that date at publication time
(2) Virtually all connect

COUNTRIES OR AREAS WITH 15 OR MORE TELEPHONES PER 100 POPULATION
(25,000 OR MORE TOTAL TELEPHONES)

The basis for this grouping has been revised to include all countries or areas which have a total of 25,000 or more telephones and a development of at least 15 telephones per 100 inhabitants. The Republic of Iceland and the Territories of Alaska and Hawaii have therefore been added.

1. United States	33.73	6. Switzerland	24.27
2. Sweden	30.44	7. Denmark	20.05
3. Hawaii	29.01	8. Australia	17.75
4. Canada	26.28	9. Norway (2)	17.17
5. New Zealand (1)	24.61	10. Iceland	17.05
		11. Alaska	16.83

(1) March 31, 1956 (2) June 30, 1955 (3) Includes data for the Isle of Man.

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reached, and no subsequent data on which to base an estimate have been made available.

An accompanying table presents data for those fourteen reporting countries.

The population density of the United States, 56 per square mile, was relatively low as compared with that of other countries in the million-or-more-telephone grouping. The two extremes in population density were represented by the Netherlands (865) and Australia (3).

The United States occupied first place both in point of actual number of telephones and in telephones per 100 population. The United Kingdom had the second-largest system in absolute numbers. Sweden ranked second as regards telephone density. Canada was third on both counts.

Of the fourteen countries under consideration, there were five in which at least 90 per cent of the telephones were operated by automatic switching: Switzerland, the Netherlands, Italy, the Federal Republic of Germany, and the Democratic Republic of Germany. About 84 per cent of the telephones in the United States were so operated.

Canada out-talked the other countries, on a per capita basis, with an average of 446 completed conversations per person during 1955, followed by the United States (409) and Sweden (407).

The United States had the world's largest privately operated system. The largest under government operation was that of the United Kingdom.

International Service

BELL SYSTEM overseas service was extended during the year 1955 to Ascension Island, Oman, and French Equatorial Africa; during 1956 to Kuwait, Jordan, and Saudi Arabia; and in the early part of 1957 to Libya, Ethiopia, and Ceylon.

Two telephone cables spanning long ocean distances were placed in service in the Fall of 1956. One is across the Atlantic, its deep-sea portion extending between Newfoundland and Scotland, permitting the establishment of cable circuits between the United States and Canada, on one hand, and the United Kingdom on the other hand. Some circuits were also established via this cable between the United States and continental Europe. The other cable extends between Seattle, Washington, and Ketchikan, Alaska.

Any of 97.2 million telephones could be reached from one in the United States, some 41 million of them located in other countries, making it possible for us to talk around the world as well as around the corner.

The Yellow Pages of the classified directory, and the emblem which denotes them, have a growing influence on the buying and selling of goods in our land

THE IMPORTANCE OF BEING PROPERLY "GREEB"

RUSSEL T. KING

Directory Engineer, DEPARTMENT OF OPERATION AND ENGINEERING, A. T. & T. CO.

IF YOU ARE unfamiliar with the Martian word "greeb", you missed A. T. & T. President F. R. Kappel's concluding remarks at the Bell System closed circuit TV program last March promoting the *Yellow Pages* – the classified section of the telephone directories.

In that telecast it was clearly established that in Martian language the term signifies approval–"very good."

"The Yellow Pages and the emblem are greeb," he said.

"Bringing people together is one of the main ideas of this business of ours. This is exactly what the Yellow Pages do, and that certainly makes the Yellow Pages, as I see it, an essential part of our whole service."

Currently the habit of "Finding it Fast" in the Yellow Pages exceeds three billion references annually and there is evidence that the American buying public, each year, is reaching more and more frequently for these pages in its 60 million telephone directories.

It matters little where the user may be–at home, at the office, in a hotel room, a public telephone location in town or along the highway–the Yellow Pages are everywhere doing a round-the-clock job for the telephone customer and the advertiser.

In thousands of communities of every size, local and national merchants share this everyday marketing place as a point-of-sale outlet for their many products and services. In fact, over six million business concerns and business and professional people describe their products and services in this medium.

The repairman just down the street, the appliance dealer several blocks away, the painting contractor, the long distance mover, the insurance agent, the butcher, the baker, and the candle-stick maker are all represented under the product headings of their trade.

In selected markets you will also find technical, scientific, and heavy-industry firms offering their products and services: the oil well driller, the steel fabricator, the chemical manufacturer, the die maker, the electronics researcher, to name a few.

There are over 4,000 classifications in

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the Yellow Pages, covering nearly everything from Abattoirs to Zippers.

Many local merchants do no other advertising except seasonal specials at Christmas time, for example. They buy large space in the Yellow Pages for their more important lines and smaller ads for other items and services. Nationally known Trade Mark products, well supported with extensive advertising programs, are frequently featured in their copy.

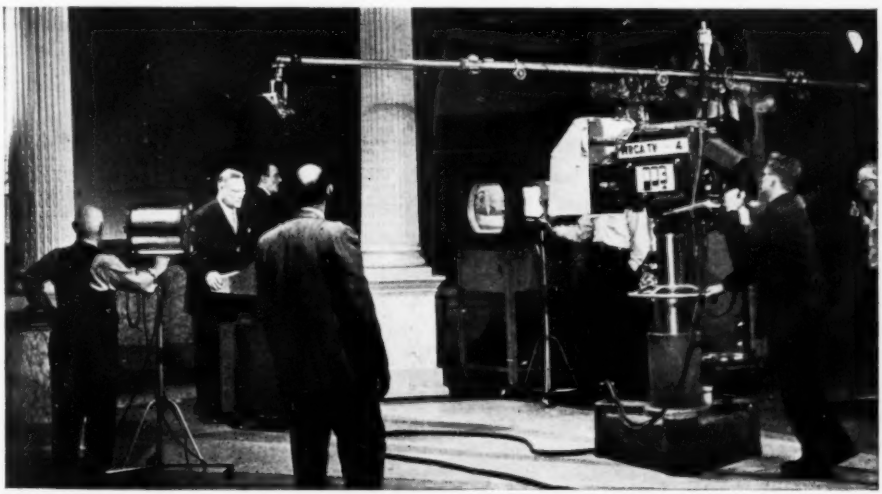
As Yellow Pages advertisers, they are quick to realize, too, the advantages of using listing matter in association with national Trade Mark advertising when authorized by the home office.

They have a healthy, dollar-return respect for the Yellow Pages. They've checked their incoming calls and visits with tested ads and personal interrogation of new customers. You see, they know the Yellow Pages are a most important door to their business—a door they want to keep open wide with a friendly, informative message to every important prospect for their products or services in the community.

FROM THE earliest beginning of commercial telephone service, it was apparent that a classified telephone directory would be helpful to the customer. Just twenty-four days after the first commercial telephone exchange was opened (January 28, 1878, at New Haven, Conn.), a small card directory was issued listing fifty customers grouped by headings such as "Meat and Fish Markets," "Hack and Boarding Stables," "Physicians," "Dentists," etc.

As the telephone industry grew, telephone directories became more and more an essential part of telephone service. The more telephone customers in a community, the more difficult it became for the average user to keep abreast of the names and telephone numbers of neighbors and friends and particularly the merchants and professional people and their products and services.

Around the turn of the century, the



A. T. & T. President F. R. Kappel took part on March 22 in a closed-circuit telecast "Paging America" promoting the Yellow Pages—the classified telephone directories. It was viewed by more than 13,000 people in 55 cities throughout the Bell System.

LIST OF SUBSCRIBERS.

New Haven District Telephone Company.

OFFICE 219 CHAPEL STREET.

February 21, 1878.

Residences.

Rev. JOHN E. TODD.
J. B. CARRINGTON.
H. B. SIGELOW.
C. W. SCRANTON.
GEORGE W. COY.
G. L. FERRIS.
H. P. FROST.
M. F. TYLER.
I. M. BROMLEY.
GEO. E. THOMPSON.
WALTER LEWIS.

Physicians.

Dr. E. L. B. THOMPSON
Dr. A. E. WINCHELL.
Dr. C. S. THOMSON, Fair Haven.

Doctors.

Dr. E. S. GAYLORD.
Dr. R. F. BURWELL.

Miscellaneous.

REGISTER PUBLISHING CO.
POLICE OFFICE.
FIRE OFFICE.
MERCANTILE CLUB.
QUINNIPIAC CLUB.
F. V. McDONALD, Yale News.
SHEDLEY BROS. & CO.
M. F. TYLER, Law Chambers.

Stores, Factories, &c.

O. A. DORMAN.
STONE & CHIDSEY.
NEW HAVEN FLOUR CO. Union St.
" " " " Cong. ave.
" " " " Grand St.
" " " Fair Haven.
ENGLISH & MERSICK.
New Haven FOLDING CHAIR CO.
H. HOOKER & CO.
W. A. ENSIGN & SON.
H. B. SIGELOW & CO.
C. COWLES & CO.
C. S. MERSICK & CO.
SPENCER & MATTHEWS.
PAUL BOESSLER.
E. S. WHEELER & CO.
ROLLING MILL CO.
APOTHECARIES HALL.
E. A. GESSNER.
AMERICAN TEA CO.

Meat & Fish Markets.

W. H. HITCHINGS, City Market.
GEO. E. LUM. " "
A. FOOTE & CO.
STRONG, HART & CO.

Work and Boarding Rooms.

CRUTTENDEN & CARTER.
BARKER & RAMSOM.

Office open from 6 A. M. to 8 A. M.
After March 1st, this Office will be open all night.

The world's first telephone directory was a classified directory.

telephone company started to promote the sale of its equipment and services in these directories. It is quite possible that the businessman first got the idea of advertising in telephone directories from the telephone company itself.

In any event, there appeared to be a growing need for such a service, and the telephone company set up a classified section and accepted advertising in 1908. Almost immediately, this section of the directory became a substantial source of business and professional information to the community. It was some years later, however, before yellow paper became its primary means of identification and the term "Yellow Pages" was coined.

Last year the Bell companies published 3,000 different telephone books, of which 2,400 had a Yellow Pages section. Fifteen cities now have separate Yellow Pages directories, and a dozen more anticipate growth which will make this step necessary in the near future.

The Yellow Pages business has doubled its size three times in the last fifteen years. Current Los Angeles and New York directories have a dollar volume equal to all Bell company books in the early 1940's.

With few exceptions, the Yellow Pages are the fastest growing media in the advertising field. Last year, for example, the growth rate, on the average, was 12.7 per cent—4 per cent better than the gain for all U. S. advertising as recently estimated by the magazine Printer's Ink.

To be most effective to the user and to the advertiser, the Yellow Pages must be accurate, up to date, and as nearly complete with pertinent buying information as is possible in the communities they serve.

In short, that the Yellow Pages are "greeb" is most important to their continuing success.

Advertising and listings in these important pages are sold, compiled, and printed with such attention to accuracy and regard for customers' wishes that customers appraise the result as 99.94 per cent accurate—edging out Ivory soap for purity.

This accuracy quality seems even more remarkable when you consider that there are over eleven million separate ads and listings in these publications.

Directory personnel carefully scrutinize each ad to check the correct spelling and the clarity of the message to the reader. They proof read even the smallest listings to be sure they are right—just as if they were their own listings. Artists skilled in the design of illustration and ad layout make certain the advertiser's message is most appealing. Printers set up the ads according to specifications for size and type face to produce the best appearance.

All this calls for a large number of spe-

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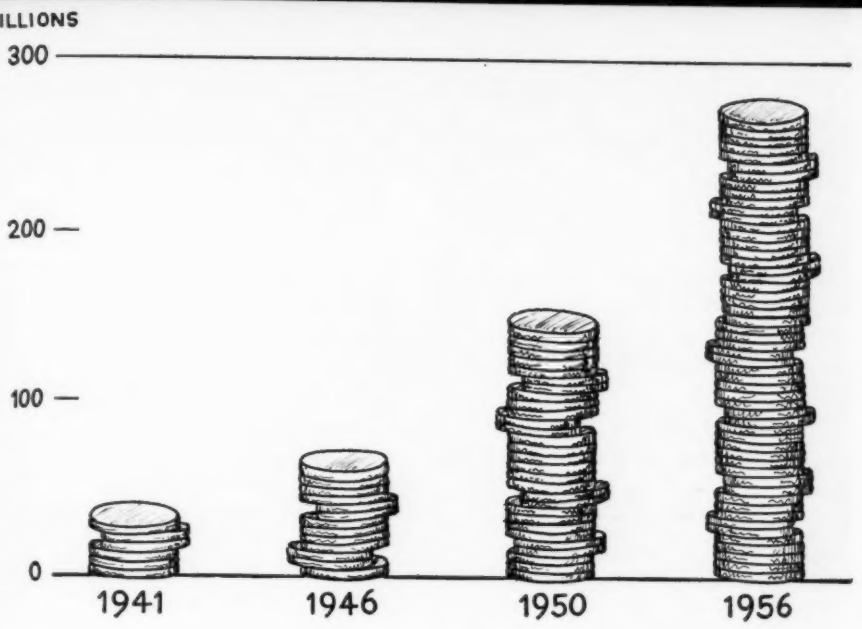

Yellow Pages revenue has doubled three times in 15 years.

cialists – nearly 15,000 people, including over 3,000 sales men and women. In addition, there are thousands of people on a sub-contract basis who are responsible for the prompt delivery of these books and the withdrawal of the previous issues from circulation.

SINCE THE Yellow Pages business is so successful, one might ask, why are the Telephone Companies giving so much time and attention to its promotion?

Perhaps I can best illustrate the viewpoint of the companies with the story of the manager of a local department store who was puzzled recently when he found that a certain cash register showed more than 100 "no sales." An investigation disclosed that a new clerk was punching the "no sale" button every time a customer walked away without making a purchase.

Like that clerk, the telephone companies are concerned with the number of potential users and advertisers who walk away from the Yellow Pages.

As an advertising medium, the Yellow Pages are primarily directional. If you always find the product or service you are looking for when you consult the Yellow Pages, you will consult it more frequently. If you and others like you in the community increase your usage, local and national merchants will purchase more advertising and represent their businesses more completely.

Keenly aware that the Yellow Pages are a profitable enterprise as well as an effective means of developing more telephone traffic, the companies have undertaken a campaign to stimulate further Yellow Pages usage and to give additional reference value to the advertiser in this important medium.

Focus of the campaign is the Yellow Pages emblem which was adopted a little over a year ago. The emblem – an open

telephone directory and a telephone—tells a simple, direct story to the public: that the advertiser who displays this symbol in his advertising, on his trucks, in his office and store windows, on his stationery, can be found "Fast" in the Yellow Pages.

During April – designated as Yellow Pages Emblem Month – the emblem will have a visibility record from coast to coast exceeded by few trade marks in the United States.

Over 100 national Trade Mark customers are displaying the emblem in 130 ads (several running more than one ad) in April issues of *Better Homes and Gardens, Saturday Evening Post,* and *Life* magazine. Bell System Yellow Pages ads featuring emblems with the names of these advertisers are also being carried in the three magazines during the month. In all, the emblem will appear more than a billion times. Nearly two million dealer mailing pieces featuring this copy have been distributed by the previously mentioned national Trade Mark customers to their community sales and service outlets. This material points out the advantage of advertising in the directory and listing under locally-carried Trade Mark ads.

The telephone companies are also undertaking an intensive local promotional program to acquaint the public with the emblem and to tell advertisers how it can help their Yellow Pages advertising sell harder. In the coming year, there will be over 20,000 TV commercials, most of which will feature the emblem and Wolley Segap (Yellow Pages spelled backwards). The emblem will be shown on billboards, counter cards, telephone trucks, window displays, bill inserts – in fact, in almost every way possible. Even the delivery people are sharing in this huge promotional effort. For example, on rainy days, to protect them from the weather, the directories will be covered with plastic bags, on which the emblem is imprinted. The carriers will also wear Yellow Pages emblem buttons and in some cases display emblem decals on their cars and trucks.

Every effort, of course, is being made to determine the effectiveness of this campaign as it moves along. Yellow Pages national advertising is checked each year by the Starch testing organization to check its value. In addition to the regular Starch interviews of magazine readers, a test was conducted in March to establish the recognition level of the emblem before the promotional campaign got under way. Succeeding tests will be made in April, May, June, September, and October. The level of recognition obtained in the later tests when compared with the level reached in the March test will give a measure of the effectiveness of the campaign as a whole.

Said John Orr Young, a leading advertising consultant, recently when commenting on the emblem, "I have been on both the advertiser's and advertising agent's side of the fence – and from either position, I can't help but be enthusiastic about a service that helps sell goods. And that's what the Yellow Pages emblem helps advertisers do."

Thus from every angle—the customer's, the advertiser's, and the telephone company's—the Yellow Pages and the emblem are "greeb" and should have a great and growing influence on the buying and selling of goods throughout the country in the years ahead.

XUM

HEADQUARTERS SUMMARY

Dec. 15, 1956, to March 15, 1957.

THERE IS growing demand for public telephone service to aircraft. Limited service now being furnished by use of the 2mc coastal-harbor stations is not adequate from either a coverage or a service standpoint. Looking toward the establishment of improved service, a trial is planned using one of the 450mc common carrier channels of the land mobile system. Ground stations are to be established by Illinois and Michigan Bell telephone companies at Chicago and Detroit. Users of the service will furnish their own airborne equipment. During the trial, charges for the service will be the same as through coastal-harbor stations.

Development of air-ground service on a national scale would require the allocation of adequate frequencies. The frequencies used in this trial must be returned to the land mobile service.

INFORMATION from controlled trials of a new method of cable splicing, known as the punched-sleeve method, offers promise of substantial savings. This is in addition to service advantages over the twisted-wire method. Among these are no stripping of insulation, no twisting of conductors, and a much better joint with slack left for future bridging. The method at present is confined to use on pulp or paper insulated conductors but is being developed further for use with other types of insulation.

Punched sleeve splicing is accomplished by inserting the wires into a special metal sleeve surrounded by an outer plastic sleeve, and placing the sleeve into the jaws of a pneumatic presser which "punches" metal teeth out of the sleeve into the conductors, thus ensuring circuit continuity. A training film recently completed portrays in step-by-step fashion all of the techniques involved in punched sleeve splicing and points out its advantages over the twisted wire method.

CUSTOMER TRIALS of the newly developed home communications system are now under way in Baltimore, Denver, and Pittsburgh. The home communications system is a relatively low-priced complete home telephone system. It provides for one central office line and two or more telephones with voice communication between any of these telephones, and also for hold, code signaling through use of the dial, and, optionally, a door answering feature.

It is planned to sell about 200 systems in each city. The trials are being made to determine customer acceptance of the system, to find out how well they meet customer needs, what features, if any, should be modified, and what combination of features is most wanted. In addition, indications of the extent and character of the market and how the system can be sold will be probed. After the conclusion of the sales activities, users will be interviewed to determine their reactions to the systems.

TRANSMISSION ZONING has for years required that a local-battery telephone set be placed on all loops over approximately 1500 ohms resistance (about 8 route miles of 22 gauge cable or 25 miles of 109 steel open wire). This is necessary because the current supplied to the transmitter becomes insufficient to provide proper transmitting power beyond these distances. However, the maintenance expense necessary to keep the batteries at the customer's premises in proper condition has proven to be very high.

For these situations, a new transistorized telephone set, called the long loop set and designed as a replacement for the local-battery set, has been developed. It contains a transistor amplifier that is powered by central office battery. Field trial was begun in November with installation of 20 of these new sets on loops ranging from 1500 to 2500 ohms out of Fort Worth and Claburne, Texas. The trial will continue for six months to a year, to determine the reliability, maintenance expense, durability, and customer opinion of the new set.

TO HELP FINANCE the contemplated $2.5 billion construction program for 1957, the Bell System raised over $375 million in new capital during the first quarter. This included the $250 million A. T. & T. 4⅝s of 1985 sold at competitive bidding to an investment group headed by Morgan Stanley & Co. on March 26 but not paid for until April 3. The other $125 million was obtained through bond issues sold by three Associated Companies, together with installments under the Employees' Stock Plan and a small amount of conversion premiums. Due to tighter

money conditions, the coupon rates on these new issues have been the highest since 1930. Compared to 1956, when the weighted average cost of new Bell System bond issues was 3.74%, so far in 1957 the average cost has been 4.36%. In the case of the $35 million debenture issue of the New England Company sold in January, the interest cost was 4.65%. Improvement in the money market lowered the interest cost for the recent A. T. & T. issue to 4.34%. Proposed sales of three more Associated Company bond issues totaling $170 million have been announced for the second quarter of 1957.

A RECENT study of where the 1,500,000 A. T. & T. share owners live reveals that they are located in more than 21,000 communities in continental United States and in more than 85 U. S. possessions and foreign countries. Only .4% live outside the United States. However, nearly half of these are in neighboring Canada.

Six states have more than 120,000 share owners residing within their boundaries and no state has less than 1,300. The largest proportion of owners to population is found in Massachusetts, with a ratio of about 2.5 per 100. New Hampshire ranks second and New Jersey ranks third.

The highest concentration of holders is naturally in New York City where 180,000 owners receive their A. T. & T. mail. Chicago stands second with 68,000 owners, and Philadelphia third with 23,000. The study shows that A. T. & T. stock continues to be distributed geographically in general accord with the investment wealth of the country.

SHIP-TO-SHORE telephone service with the United States was initiated with the new 19,000-ton S.S. Monterey of the Oceanic Steamship Company on January 8. This new cruise ship voyages between San Francisco and Sydney, Australia, with stops at Honolulu, Hawaii, and Pago Pago, Samoa.

On February 6 ship-to-shore service was made available to the 24,300-ton S.S. Statendam of the Holland-American Line when that cruise ship started its maiden voyage. These additions bring to 42 the number of ocean-going vessels receiving high seas telephone service. The cost of a three-minute call (Federal Excise tax not included) ranges from $6 to $9, depending on the location of the ships.

The latest addition to the countries linked with the United States by overseas service is Ethiopia. Since March 15 service has been provided from New York to Addis Ababa, Ethiopian capital, via London. The rate for a three minute call, excluding tax, to any point in Ethiopia is $15. That addition to the service brings to 115 the number of countries linked by Bell System overseas service.

TWO BELL LABORATORIES developments illustrate the fact that testing procedures must keep pace with advances in equipment and apparatus.

A new telephone-dial testing machine measures the make-and-break time of every operation of the pulsing contact during dial rundown, and displays the results in the form of dots on a cathode ray tube. Performance limits are readily marked on the face of the tube, and various patterns of deviation from normal are good indications of specific faults.

In a second Laboratories development, two machines are used in the testing of telephone cords: one tests for wear and abrasion of the jackets and braid, and the other, a bending machine, tests conductor life. Size and type of conductors, insulating materials, terminals, jacket materials, and many other features of cords can thus be tested in the laboratory. The wear and abrasion machine, sometimes called a "kinking" machine, drags either regular or retractile cords over various abrading materials. The bending machine puts cords through a test cycle that simulates the use a cord gets in service.

SEARCHING for the cause of mysterious fault in a transmission filter circuit, Bell Laboratories investigators several years ago discovered microscopic metal "whiskers" of tremendous physical strength. Now, with continued research into the fundamental properties of such whiskers, it has been found that neutron bombardment of tin samples accelerates their growth. The experiments were carried out in cooperation with the Brookhaven National Laboratory on Long Island. The research has resulted in more precise recommendations for the use of metals—especially metal-plating materials—in telephone apparatus. Gold plating is now specified in many critical Bell System circuit applications to prevent failure caused by whisker growth.

THE TRANSATLANTIC telephone cable was used on January 24 as the transmission medium for a unique joint conference of the A.I.E.E., the Engineering Institute of Canada, and the British Institution of Electrical Engineers. The presidents of these organiza-

tions opened the three-way, hour-long conference. After an introductory address by Dr. M. J. Kelly, Bell Laboratories president, scientists and engineers from the U. S., Canada, and Great Britain spoke on the design, engineering, and manufacture of the cable. Following these talks, brief addresses were delivered by Sir Archibald Gill, former engineer in chief of the British Post Office; T. W. Eadie, president of the Bell of Canada; D. F. Bowie, president of the Canadian Overseas Telecommunication Corporation; and C. Lawton, general plant engineer, International Communication, Western Union Telegraph Company. During the conference, authors of other technical papers on various aspects of the cable were also introduced to audiences in the three countries.

"SUPERMENDUR" is a new relative of a magnetic alloy, 2V-Permendur, developed at Bell Laboratories many years ago. Although similar in composition to the older alloy, Supermendur has characteristics improved to a remarkable degree. The gains were achieved mainly by using materials of the highest purity and by developing a precise schedule of melting, rolling, and heat treatment in a magnetic field. Supermendur has a composition of 49% iron, 49% cobalt, and 2% vanadium. It permits power transformer outputs 30% greater than those of transformers with cores of grain-oriented silicon steel, previously the best available material. A 30% reduction in core size and weight for the same output is possible in many applications. Along with its advantages for use in power transformers, Supermendur is ideally suited for pulse transformers and magnetic amplifiers and for various switching and memory devices.

A COMPLETELY NEW SOURCE of microwave power operating under new physical principles was recently announced by Bell Laboratories. The device, the significance of which was emphasized by President M. J. Kelly in an address before the American Physical Society, is termed a solid-state "spin oscillator." Although still in the early research stage, the oscillator is expected to have a noise figure hundreds of times better than conventional microwave circuitry. Thus, in theory, it could result in radically new long-distance communication systems for telephone and television and in a greatly extended range for radio astronomy. Unlike electronic oscillators, which depend upon the motions of charged particles at high temperatures, the spin oscillator achieves oscillation through electron spins in a para-magnetic crystal at low temperatures. In an experiment at the Murray Hill Laboratory, continuous oscillations at 9000 megacycles were produced with an output of 20 microwatts.

AND NOW what about our cover painting for this Spring 1957 issue?

It is named there and on the Contents Page —but the artist isn't. Since that isn't the way we usually do it, there must be a reason. There is—and a tale.

When Bill Haesche, author of the Science Series article which begins on page 5, was in Hollywood in connection with the production of "The Unchained Goddess," he saw there a preliminary sketch in full color for the animation of one of the scenes. So fascinated was he with the whole painting—colors, characters, design — that he begged it for his own, and when it has served its purpose, he brought it back East. It was a "natural" for our cover, of course. Unfortunately, it had been executed in a horizontal proportion which wasn't adapted to the upright oblong of the Magazine's page size; but the Public Relations Department's able art staff soon remedied that. They copied the whole painting accurately—colors and characters—but so compressed it laterally that now it all fits in the space where you see it. And don't you feel about it somewhat as Mr. Haesche felt about the original—which he still has?

"The Unchained Goddess" is Meteora, the heroine of the fourth Science Series program. She is holding court—on the cover—surrounded

by her attending gods. Thor, God Of Thunder, blusters from the left. Boreas, God of the Winds, leans attentively on one end of Meteora's couch, while the triplets Hail, Snow, and Rain sit on the other. Meanwhile, Cirrus, artist and God of the Clouds, paints unconcernedly at Meteora's feet.

It's quite an allegory—and a painting.

WE HAVE COMMENTED more than once on the coincidences which pop up in this department every now and then. Whether they occur more frequently in our business than in others or just come to notice because we are observant in this field is anybody's guess. We do note 'em, in any case. Here is a double-barreled one.

While we were being rather overcome by the general ballyhoo about the Yellow Pages —see page 60, and Wolley Segap to you—what should appear in our in-box one day but this gay and lilting verse, written more than 40 years ago by Berton Braley, who has kindly given us permission to reprint it.

THE TELEPHONE DIRECTORY

What is there seeming duller than this book,
This stolid volume of prosaic print?
And yet is is a glass through which we look
On wonderland and marvels without stint.
It is a key which will unlock the gate
Of distance and of time and circumstance,
A wand that makes the wires articulate
With hum of trade and whisper of romance!

Somehow there is enchantment in each page—
The whirr of wheels, the murmurs of the mart,
The myriad mighty voices of the age,
The throbbing of the great world's restless heart,
Such are the sounds this volume seems to store
For him who feels the magic of its thrall,
Who views the vistas it unrolls before
His eyes that scarce can comprehend them all!

Here is the guide to all the vast extent
The wires have bound together, this will show
The way to help when need is imminent,
When terror threatens or when life burns low;
This brings the lover to his heart's desire,
That he may speak to her o'er hill and lea,
This is the secret of the singing wire,
To all the "world without" this is the key!

No sooner had we put that aside for later reference—and here comes the second barrel —than the British Post Office's monthly *Post Office Magazine* arrived, with its interesting news of many forms of communication—including telephone service—in the British Isles. And there too appeared a well turned bit of verse by H. C. Badger, of Caerleon: all the more interesting to us, perhaps, because a kiosk is, as most of us know, a booth; and because the public telephones (or pay stations still to some) have a "button A" which must be pressed after the coin has been deposited and the connection established in order that the conversation may proceed. (Well, our way probably seems odd to them too.)

THE TELEPHONE KIOSK

It stands serene in coat of glowing hue,
Sometimes in groups but oftener alone.
At once a boon and source of revenue,
The kiosk of the public telephone.

Its countless tribe have marched from coast to coast
Beyond the bounds of borough they have spread.
What hamlet so remote that cannot boast
A kiosk flaunting its familiar red?

To serve a public need it is installed.
Who dare dispute it does its duty well?
Confide to it whom you require be called,
With metal nerves, it rings his signal bell.

Ten thousand close-kept secrets it has heard,
Ten thousand breathless confidences told.
While oft some listening one has trembling feared
The doleful story that it might unfold.

Who knows? perhaps the news it has to tell,
Some sinking soul to hope again inspires,
Or fading hope at last may hear its knell
Transmitted down the gaily humming wires.

A whispered word of love breathed in its ear
May make a sorrow-laden heart rejoice,
When from some distant place comes loud and clear
The music of a well-remembered voice.

Of many confidences sole trustee,
Which, once reposed, it never will betray,
Repeating not, but the words of he
Who pays the charge and presses button A.

Does this look like a special Poetry Issue? Then if you seek a third coincidence—let us remind you that it's Spring.

THESE VERSES call forth another reminder also —and a pointed one! They are well written. They fall into the category of light verse, it is true—but they require skill and *esprit* in composition, for all that. Save for the solecism in the next-to-the-last line above—perhaps justified somewhat by the need for rhyme—they are excellent examples of their kind. And if anyone imagines that because they are "light"

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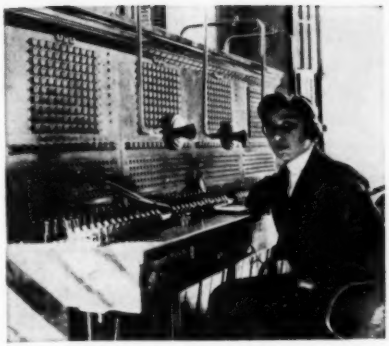

James S. Russell as a night boy operator in Salisbury, Md., in 1905.

they are easy to do, let him learn to write lines that rhyme and scan before he holds any hope of seeing them in print.

Now LET US TURN from Messrs. Braley and Badger to James S. Russell, in whose home in Salisbury, Md., was installed last March the fifty millionth Bell System telephone. He was given a reception in New York and an illuminated scroll and a gold plaque on that special telephone, as representative of all Bell employees, because he went to work as a night operator in Salisbury in the Spring of 1904 and is still at it—longer than any other Bell System employee now active. Jim Russell was 12 years old then, and alone night after night on the second floor of a building where the shadows flickered and the stairs creaked. He is a district plant engineer of the Chesapeake and Potomac Telephone Company of Maryland now, and many pictures about him have been published; but the one we like best shows young Jim Russell at his switchboard back in 1905. He was older by then, of course. A year older.

IF THE Genius of Electricity should spread his wings and take flight from his perch atop the A. T. & T. headquarters building in New York, or the next issue of this MAGAZINE appear in purple ink on gold leaf, or telephone vacations be equated to one week for each consecutive year of service, you may attribute such unexpected aberration to reaction to a letter delivered to the editor from Kent, England, not long ago. The first line of the address on the envelope was, simply and clearly,

The Public Relations Department of America.

J.S.B.

Who's Who & What's What

(Continued from page 2)

Washington-Idaho Area in 1953—whence he headed East three years later.

JOINING The Pacific Telephone and Telegraph Company in 1944 as a stenographer in the Plant Department, HEATHER PETO soon found herself in the Public Relations Department there. Among her assignments have been work on The Pacific Telephone Magazine and on the employees' booklet rack service. How well she exemplifies the practice of good writing—her present assignment—is borne out by the exercise of the editorial blue pencil on her manuscript but once—and that to change the order of two words.

AFTER THREE YEARS in accounting assignments with the New England Telephone and Telegraph Company, beginning in 1946, RAYMOND H. FROST was loaned to the operating division of the Comptroller's

Raymond H. Frost

Department of A. T. & T., where he was associated with the first major trial of punched-card equipment for toll billing. Back in New England in 1953, he transferred two years later to the A. T. & T. operation division of the Comptroller's Department as group supervisor for accounting mechanization and clerical operations. Just a year ago he moved over to the engineering division of the O. & E. Department, where, as head of a new group in the systems planning section, he has been working for the improvement of clerical operations and paperwork procedures throughout the System. The policies which bring these about are determined by an inter-departmental clerical operations committee, of which Mr. Frost is chairman. Its steering committee consists of representatives from the Accounting, Commercial, Engineering, Personnel Relations, Plant, Public Relations, Traffic, and Treasury Departments; and a working committee, reporting to appropriate members of the steering committee and made up of members from Accounting, Commercial, Engineering, Plant, and Traffic.

Elizabeth Wrenshall

Edward L. Sherman

FROM FOUR YEARS of work in banks in the mid-West, EDWARD L. SHERMAN moved to telephone work with A. T. & T., joining the commercial division of O. & E. as an engineering assistant in the commercial survey section in 1926. In 1930 he undertook sales results work in the sales and development section. Five years later he changed to sales promotion work, and in 1937 to station forecasting in the general commercial problems section. In military service from 1942 to 1946, he returned to the rate section of A. T. & T.'s commercial division. Then, with the formation of a new sales promotion section a year ago, he was appointed new and special services engineer.

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IT IS PLEASANT to record ELIZABETH WRENSHALL'S eighth annual contribution on the topic of the world's telephones: how many there are, and where. It will be apt—if repetitive—to note that she was a teacher in schools abroad before World War II and a translator for censorship authorities during that struggle, and a member of A. T. & T.'s Headquarters group since 1945. Miss Wrenshall's ability with foreign tongues is a great asset in gathering and compiling the data which she uses in her daily activities.

THE YELLOW COLOR which appears here and there throughout this issue is an acknowledgment of RUSSEL T. KING'S energetic promotion of the virtues of the Yellow Pages. His telephone career began with the Bell Telephone Company of Pennsylvania in 1929, and by 1936 he had progressed through various posts to that of directory sales manager. In 1943 he transferred to A. T. & T. as trade mark engineer, and worked on various aspects of sales until 1952. In that year he became head of the right-of-way sales group, and in 1956 he took on the added assignment of industry sales engineer. Late last year he was appointed directory engineer. To this MAGAZINE for Spring 1954 Mr. King contributed "Communications for Right-of-Way Companies."

Russel T. King
(snapped at the Yellow Pages telecast)

INDEX NOW AVAILABLE

AN INDEX to Volume XXXV (1956) of the BELL TELEPHONE MAGAZINE may be obtained without charge upon request to the Public Relations Department of the American Telephone and Telegraph Company, 195 Broadway, New York 7, N. Y.

The MAGAZINE is also reproduced on microfilm: one volume to a single roll of positive film, on a metal reel, suitably labeled. Inquiries concerning microfilms of the MAGAZINE should be addressed to University Microfilms, 313 N. First Street, Ann Arbor, Mich.

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